Mark-Recapture Studies of Taku River Adult Sockeye Salmon Stocks in 2012 and 2013

Ian M. Boyce
James E. Andel

November 2014

Pacific Salmon Commission
Technical Report No. 32

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Prepared for:
Pacific Salmon Commission
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November 2014

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ABSTRACT

Mark-recapture studies of adult Taku River salmon *Oncorhynchus* stocks were conducted by the Department of Fisheries and Oceans Canada, the Alaska Department of Fish and Game, and the Taku River Tlingit First Nation in 2012 and 2013. The objectives of the studies were to provide inseason estimates of the inriver abundance of sockeye *O. nerka* and to document biological characteristics (migratory timing, migratory rates and age, sex, and size composition) of Taku River sockeye stocks. Tagged-to-untagged ratios of salmon harvested in the Canadian inriver gillnet fisheries were used to develop the estimates of the inriver abundance of sockeye.

In 2012, a total of 4,441 sockeye salmon were captured in fish wheels located at Canyon Island, Alaska, of which 4,161 were tagged and 1,674 (40.2%) were subsequently recovered or observed in fisheries or on the spawning grounds. The inriver run of sockeye salmon past Canyon Island from June 10 to September 9 was estimated to be 155,590 fish (95% confidence interval 142,119 to 169,060). An expansion factor based on fish wheel CPUE estimated 1,287 additional sockeye salmon migrated past Canyon Island prior to June 10 and after September 9, for a total above border escapement of 156,877. Canadian commercial and Aboriginal fisheries harvested 30,062 and 169 sockeye respectively, resulting in a spawning escapement estimate of 126,646 sockeye salmon. Based on mean date and standard deviation of migration timing the sockeye salmon run was slightly late and more compressed than the 2002-2011 average. The Canyon Island catches of 5,826 pink salmon, 232 chum salmon and 24 steelhead salmon were 51.5%, 19.6%, and 80.4% below average, respectively. The pink salmon run was two days later and slightly more compressed than average.

In 2013, a total of 4,240 sockeye salmon were captured in fish wheels located at Canyon Island, Alaska, of which 4,011 were tagged and 1,411 (35.2%) were subsequently recovered or observed in fisheries or on the spawning grounds. The inriver run of sockeye salmon past Canyon Island from June 10 to September 11 was estimated to be 96,928 fish (95% confidence interval 90,835 to 103,020). An expansion factor based on fish wheel CPUE estimated 9,092 additional sockeye salmon migrated past Canyon Island prior to June 16 and after September 9, for a total above border escapement of 106,020. Canadian commercial, test, and aboriginal fisheries harvested 25,125, and 99 sockeye, respectively, resulting in a spawning escapement estimate of 80,796 sockeye salmon. Based on mean date and standard deviation of migration timing the sockeye salmon run was slightly late and less compressed than the 2003-2012 average. The Canyon Island catches of 4,666 pink salmon, 269 chum salmon and 11 steelhead salmon were 61.2%, 7.6%, and 90.5% below average, respectively. The pink salmon run was four days earlier and slightly more compressed than average.

KEY WORDS: mark-recapture, stratified population estimations, escapement estimation, migratory timing, Taku River, transboundary river, salmon, fish wheel, age, length and sex composition, Pacific Salmon Treaty

INTRODUCTION

Inseason estimates of the spawning escapement of Taku River sockeye *Oncorhynchus nerka* are needed to fulfill the escapement goal and international harvest sharing requirements for stocks specified by the U.S./Canada Pacific Salmon Treaty. The Taku River mark-recapture project has been conducted annually since 1984 (Clark et al. 1986; McGregor and Clark 1987, 1988, 1989; McGregor et al. 1991; Kelley and Milligan 1999; Boyce and Andel 2012) as a joint U.S./Canada program involving the Alaska Department of Fish and Game (ADF&G) and the Department of Fisheries and Oceans Canada (DFO) to provide weekly estimates of the Taku River salmon escapement past Canyon Island, Alaska (Figure 1). The Taku River Tlingit First Nation (TRTFN) began providing a technician to assist with operations in 1994. U.S. and Canadian fishery managers use CPUE and stock composition data from the U.S. District 111 and Canadian Taku River commercial gillnet fisheries and escapement estimates from this project to adjust fishing times, catches, and escapements.

The Taku River is a transboundary river which originates in northern British Columbia and flows southwest through the Coastal Mountain Range and Southeast Alaska to the Pacific Ocean (Figure 1). The Taku River supports numerous stocks of salmon that are harvested by Canadian and U.S. gillnet fisheries. The Canadian fishery, which occurs inriver, targets Taku River chinook[1], sockeye and coho salmon and incidentally harvests chinook and pink salmon. The U.S. drift gillnet fishery which occurs in Taku Inlet and approach waters, primarily targets Taku River chinook and sockeye salmon stocks as well as summer chum salmon from local Alaskan enhancement programs during the summer months and mixed stocks of coho in fall. The U.S. fishery also incidentally harvests chinook and pink salmon. The Canada/U.S. Pacific Salmon Treaty (PST) of 1985, and subsequent additions to the original treaty, established conservation (71,000 to 80,000 escapement goal) and harvest sharing (percentage sharing of the allowable catch) objectives for the Taku River sockeye salmon run. The PST mandates cooperative international management of transboundary river stocks. The most intensive cooperative management is directed at sockeye, coho, and chinook salmon.

Mark-recapture methods were used in 2012 and 2013 to estimate sockeye, chinook and coho salmon escapements. Chinook and coho studies are described in separate reports published by the ADF&G Division of Sport Fish and/or the Pacific Salmon Commission (in prep.) Fish wheels located at Canyon Island were used to capture sockeye, chinook, and coho for tagging. Tagging data coupled with ratios of tagged to untagged fish in the Canadian fisheries upstream were used to develop escapement estimates inseason.

The fish wheels also catch pink, chum and steelhead salmon. Although abundance is not estimated, the catches do provide an index of interannual variation. This is especially valuable if the entire migration period is bracketed by the period of fish wheel operation (for example, as with pink salmon).

Age, length, and sex data were collected from sockeye, pink, and chum salmon caught in the fish wheels.

[1] Directed chinook fisheries were implemented as a result of an agreement reached between the U.S. and Canada in February 2005.

OBJECTIVES

The primary goals of the Taku River sockeye salmon tagging program in 2012 and 2013 were to obtain information on the above-border run size, distribution, migratory timing, and age-sex-size composition of sockeye salmon stocks in the Taku River drainage.

Specific objectives of this study were:

1. Estimate the total spawning abundance of sockeye salmon returning to Canadian portions of the Taku River with an estimated coefficient of variation no greater than 10% of the estimate. Estimate weekly inriver abundance with a coefficient of variation no greater than 20% of the estimate;

2. Estimate the age, length, and sex composition of sockeye salmon migrating past the fish wheel site on a weekly basis;

3. Forecast total abundance of sockeye salmon on a weekly basis based on tag-recovery data and historical migration-timing data;

4. Quantitatively describe the migratory timing (mean and variance) of the sockeye, pink, and chum salmon migrations past Canyon Island; and

5. Estimate the annual age and sex composition of pink and chum salmon migrating past the fish wheel site.

Objectives for the Taku River coho and chinook salmon mark-recapture studies are outlined in reports published by the Pacific Salmon Commission and/or the ADF&G Division of Sport Fish.

METHODS

Study Area Description

The Taku River originates in the Stikine plateau of northwestern British Columbia, and drains an area of approximately 17,000 square kilometres (Figure 1). The merging of two principal tributaries, the Inklin and Nakina Rivers, approximately 50 km upstream from the international border forms the Taku River. The river flows southwest from this point though the Coast Mountain Range and empties into Taku Inlet about 30 km east of Juneau, Alaska. Approximately 95% of the Taku River watershed lies within Canada.

The Taku River is turbid, with much of its discharge originating in glacial fields on the eastern slopes of the Coast Range Mountains. This turbidity precludes complete enumeration of salmon escapements in many areas by aerial or foot surveys. Water discharge in the summer generally increases in proportion to the amount of sunshine received in the interior on coastal mountain ranges (ADF&G 1955). Winter (February) flows range from approximately 40-104 m^3/s at the U.S. Geological Survey water gauging station located on the lower Taku River near Canyon Island (Schellekens et al. 1996). Discharge increases in April and May and reaches a maximum average flow of 700-1,400 m^3/s during June. Flow usually remains high in July and drops in late August. The efficiency of fish wheels used to capture fish for

tagging and the effectiveness of the Canadian commercial fishery are affected by the magnitude of river discharge. Sudden increases in discharge in the lower river result from the release of the glacially impounded waters of Tulsequah Lake (Kerr 1948; Marcus 1960). These floods usually occur once or twice a year between May and August. During water years 1988 to 1995 the instantaneous peak flow due to a Tulsequah event was 2,889 m^3/s (August 17, 1989; Shellekens et al. 1996). During the floods, water levels fluctuate dramatically and the river carries a tremendous load of debris.

Fish Wheel Operation

Migrating adult salmon were captured with two fish wheels at Canyon Island, located approximately 4 km downstream from the international border (Figure 1). Each fish wheel consisted of two aluminum pontoons in a framework, measuring approximately 12 m in length and 6 m in width and filled with closed-cell styrofoam for flotation, supporting an axle, paddle, and basket assembly. Two fish-catching baskets were rotated about the axle by the force of the water current against the baskets and/or paddles. As the fish wheel baskets rotated, they scooped up salmon. V-shaped slides attached to the rib structure of each basket directed fish to aluminum liveboxes bolted to the outer sides of the pontoons.

The fish wheels were positioned in the vicinity of Canyon Island on opposite riverbanks, approximately 200 m apart, and have been operated in identical locations since 1984. They were secured in position by anchoring to large trees with 0.95 cm steel cable and were held out from, and parallel to, the shoreline by log booms. The Taku River channel at this location is ideal for fish wheel operation. The river is fully channelized through a relatively narrow canyon that has very steep walls.

The fish wheels rotated at 0-4 r.p.m., depending on the water velocity and the number of attached paddles. When water levels subsided, more paddles were attached and the fish wheels were moved farther out from shore into faster water currents to maintain a speed of basket rotation adequate to catch fish.

Over time it has become clear that Tulsequah River floods are preceded by a sudden decline in river temperature and a corresponding rapid increase in river level. It is standard operating procedure to stop the fish wheels when river levels near 290 cm (114 inches, standardized gauge measure). By doing so, damage to the fish wheels is minimized and significant labour and material costs avoided.

Baskets and liveboxes are removed from the pontoons and stored on high ground during the off season. The pontoons are towed upstream to a backwater slough and securely moored during the off season.

Tagging and Sampling Procedures

All sockeye captured in the fish wheels were sampled for sex and mid-eye to fork of tail length (MEF). In addition, a sub-sample of 260 sockeye salmon per week were sampled for scales. Cliethral arch to fork of tail (CAF) length measurements were taken from 200 sockeye salmon throughout the season, and paired with MEF measurements. Canadian fish buyers prefer a headless, gutted product; because of this, the only length measurement available from the commercial fishery was CAF. The paired MEF and CAF measurements from the fish wheels allow conversion of CAF measurements to MEF.

All chum salmon were sampled for sex, scales, and MEF length. The daily sampling goal for pink salmon was 25 fish; these fish were sampled for sex and MEF length.

All uninjured sockeye greater than 350 mm (MEF length) were tagged with numbered spaghetti tags. Sockeye less than 350 mm (MEF) were not tagged because fish in this size range are virtually

unsusceptible to capture in the upriver gillnet fishery from which tagged to untagged ratios are used to develop population estimates for these species. Sockeye salmon with serious wounds (most often thought to be seal inflicted) were not tagged. Pink, chum and steelhead salmon were not tagged.
Salmon were dipnetted from the fish wheel liveboxes into a tagging trough partially filled with river water. Spaghetti tags (Floy Tag and Manufacturing Inc., Seattle, WA)[2] were applied to sockeye salmon as follows: one person held the fish in the tagging trough while a second person inserted a 15 cm applicator needle and attached spaghetti tag through the dorsal musculature immediately below the dorsal fin. The ends of the spaghetti tag were then knotted together with a single overhand hitch. Biological sampling was also conducted during application of the spaghetti tags. Sex and length measurements were recorded, and scale samples taken from all chum salmon, and sub-samples of the sockeye salmon caught. Sex and length data were also collected daily from a sub-sample of 25 pink salmon, but scales were not taken from this species. The tagging and sampling procedures took from 40 to 60 seconds per fish to complete. The fish were then immediately and gently released back into the river.

The spaghetti tags used for sockeye salmon were made of hollow fluorescent orange PVC tubing (approximately 2.0 mm in diameter and 30 cm in length) and were consecutively numbered and labeled with project description information.

In general, fish wheel catches were sampled in the morning, afternoon, and evening. Less frequent checks, morning and evening, were made during lulls in the migration to minimize crew overtime. During peak migration times catches were sampled more frequently, early in the morning and late at night.

Tag Recovery

Sockeye were inspected for tags in Canadian commercial and test fisheries, which occurred in Canadian portions of the Taku River within 20 km of the international border. Catches that were not available by statistical week were censored, for example the aboriginal ("food fish") catch. All sockeye salmon caught in the commercial and test fisheries were considered to have been examined for tags and all of the captured tags were considered to have been recovered.

The commercial fishery was open from one to seven days per week from April 29 to October 7 in 2012 and from June 16 to October 6 in 2013 . Chinook salmon were targeted until mid-June (2012 only); sockeye salmon from mid-June until mid-August; and finally coho salmon for the remainder of the season. In 2012, a coho salmon test fishery took place from September 9 to October 3. Drift and set gillnets were the gear types used; maximum allowable mesh sizes ranged from 14 cm (5 1/2 inches) to 20.4 cm (8 inches); most fishers used mesh sizes of 13-14 cm (5 1/4 - 5 ½ inches) during the sockeye season.

Daily tag return was a condition of the Canadian commercial licence. As an additional incentive, a cash reward of $5.00 (Canadian) was offered by DFO for each sockeye tag returned from any fishery (i.e. commercial, aboriginal, or test fishery). Canadian catch statistics and tags were collected daily during fishery openings by DFO personnel stationed at Ericksen Slough, just upstream of the Tulsequah River. Catch statistics were communicated to the DFO office in Whitehorse via satellite telephone or email and then relayed to the ADF&G office in Juneau. ADF&G offered a $2.00 (U.S.) reward for each tag returned from the District 111 and the inriver personal use fisheries. Tag observations and recoveries were also made at enumeration weirs located at Kuthai, King Salmon, Little Trapper, and Tatsamenie lakes. In 2012 recoveries were also made on a sampling excursion to the Nahlin River spawning grounds.

[2] Mention of trade names does not constitute endorsement by DFO or ADF&G.

Sex, length, and scale data were obtained from these locations as well as the commercial and test fisheries.

Tagging and tag recovery data were organized by statistical week for analysis. Statistical weeks begin at 00:01 AM Sunday and end the following Saturday at midnight, with weeks being numbered sequentially beginning with the week encompassing the first Saturday in January. Inclusive dates for 2006 statistical weeks are shown in Appendix A.

Statistical Methods

Sockeye salmon tagging data, tag recovery data and catch data were entered into an abundance estimation program which is referred to as the Stratified Population Analysis System (SPAS) (Arnason et al. 1996). This model provides stratified population estimates using maximum likelihood techniques (Plante 1990) and associated variances when s (the number of tagging stratum) and t (number of recovery stratum) are not equal. For cases in which $s=t$, the model provides stratified population estimates based on Chapman and Junge (1956) and Darroch (1961). This stratified method was used because it allows the probabilities of capture in tagging and recovery strata to vary across the strata.

Assumptions necessary to form consistent (i.e., approaching unbiased as sample size increases) stratified mark-recapture estimates in this study include (Arnason, et al. 1996):

1. All fish that pass Canyon Island during the period of interest have a non-zero probability of recovery in the commercial fishery and all fish caught by the fishery have a non-zero probability of being tagged (i.e., the population is closed);

2. There is no tag loss, tag induced mortality, tag mis-identification or non-reporting. Should any of these occur, they are to be estimated and adjusted for;

3. All fish, tagged or not, are independently caught with the same probability in any given recovery stratum;

4. All fish, tagged or not, move from a given release stratum to the recovery strata independently with the same probability distribution; and

5. There are no release strata or recovery strata where no tags are released or found respectively, and there are no rows or columns of the release-recovery matrix which are linear combinations of other rows or columns respectively.

The first assumption is addressed by the fact that two fish wheels are used in a consistent manner throughout the season and that the inriver fishery is conducted weekly. For the second assumption, tag-induced mortality was shown to be insignificant in a holding study conducted by McGregor and Milligan (1991, unpublished data). The extent of tag loss by shedding, misidentification, or non-reporting, was also found to be negligible in that study and several subsequent ones (e.g. Kelley et al., 1997). The third and fourth assumptions have not been assessed, while the fifth assumption is met by pooling of various recovery or release strata.

Inriver sockeye salmon run estimates were generated on an inseason basis each year. Mark-recapture data was forwarded to the Whitehorse DFO and Juneau ADF&G offices after each day of the commercial fishery. Data was analyzed and inriver abundance estimates were developed. Historical migratory timing data was then used each week to project the total inriver run size for the season. Due to the estimated three

to four days travel time for fish between the Taku Inlet gillnet fishery and Canyon Island (Clark et al. 1986), as well as between Canyon Island and the Canadian fishery (based on current year tag recovery data), our estimates of inriver abundance corresponds with the movement of Taku River sockeye salmon through District 111 approximately one to two weeks earlier.

Fishery management decisions that affect the magnitude and distribution of harvests and escapements are based in principle on the measured or perceived abundance of fish through time. Mundy (1982) described a set of statistics, termed migratory timing statistics, useful for characterizing the annual timing of fish migrations and for comparing the timing of migrations between years. Abundance per unit of time is divided by the total abundance throughout the migration to generate a time series of proportions, or time density. The shape of the time density characterizes the timing and temporal distribution of the migration. Two simple features of the time density are the mean date and variance or dispersion of the migration through time. We used fish wheel CPUE as an index of the abundance of fish migrating past Canyon Island, and calculated migratory timing statistics following the procedures of Mundy (1982). The mean date of passage in a migration of *m* days was estimated by:

$$\bar{t} = \sum_{t=1}^{m} t * P_t \quad , \tag{1}$$

where $\bar{t}$ was the mean day of the migration (t=1 was the first day of the migration and m was the last day), and P_t is the proportion of the total cumulative fish wheel CPUE that occurred on day t. The calculated mean date is reported as the corresponding calendar date.

The variance of the migrations was estimated by:

$$s_t^2 = \sum_{t=1}^{m} (t - \bar{t})^2 * P_t \quad , \tag{2}$$

The timing of individual sockeye salmon stocks past Canyon Island was derived from recoveries of tagged fish on the spawning grounds and was weighted by fish wheel CPUE to permit the escapement of a particular stock to be apportioned to week of passage past Canyon Island. The formula we used for determining the proportion of the run occurring each week for each stock was:

$$\frac{\frac{C_k * T_{ks}}{T_k - T_{kc}}}{\sum_{j=22}^{38} \frac{C_k * T_k}{T_K - T_{kc}}} \quad , \tag{3}$$

where: *k* is the statistical week of interest; C_k is the weekly proportion of the total season's fish wheel CPUE, T_{ks} is the number of spawning ground recoveries of stock s that were tagged in week *k*, T_k is the number of fish tagged at Canyon Island in statistical week *k*, and T_{kc} is the number of fish tagged at Canyon Island in statistical week *k* and caught in the Canadian fishery.

An assumption implicit in this calculation is that the removal of fish by the Canadian inriver fishery does not alter the migratory timing distribution of individual stocks. This assumption may be violated because the Canadian fishery harvest rate of the inriver run varied between fishing periods.

RESULTS

Fish Wheel Operation

Fish wheels were operated on the Taku River from May 21 through September 15 in 2012, and from May 15 through September 9 in 2013. Demobilization dates were earlier than average due to funding constraints. In 2012, Fish wheel I (located furthest upriver) was installed on May 22; Fish wheel II was installed on May 21. In 2013 both fish wheels were installed on May 15. Additional details regarding operations are presented in Appendix B.1

The aluminum two-basket configuration first used in 1996 has proven to be effective at very low river levels (as measured on a permanent staff gauge).[3]

Fish Wheel Catches

Daily catches of sockeye, pink, and chum salmon in the Canyon Island fish wheels are listed in Appendices B.1. Dates of operation and the total fish wheel catch by species for the 1984 to 2013 period are presented in Table 1. Graphs of the fish wheel CPUE for sockeye, pink, and chum salmon are included in Figure 3.

In 2012 a total of 4,441 sockeye salmon were captured in the Canyon Island fish wheels. This was 9.2% below the 2002 to 2011 average (Table 1; Appendix B.1a). An additional 12 fish were captured in gillnets in early September but were not tagged. Fish wheel catches occurred from June 1 through September 9, and peaked during statistical week 30 (July 22 through 28), when 957 sockeye salmon were captured. Prior to the first Canadian directed sockeye commercial fishery opening on June 17 (statistical week 25), 107 sockeye salmon had been captured in the fish wheels (Appendix B.1a).

In 2013 the fish wheel catch of sockeye salmon was 4,240 fish. This was 10.8% below the 2003 to 2012 average (Table 1; Appendix B.1b). An additional 107 sockeye were caught in gillnets in late August. Although 90 of these fish were tagged they are not included in the study. Fish wheel catches occurred from June 4 through September 9, and peaked during statistical week 29 (July 14 through 20), when 681 sockeye salmon were captured. Prior to the first Canadian directed sockeye commercial fishery opening on June 16 (statistical week 25), 363 sockeye salmon had been captured in the fish wheels (Appendix B.1b).

As in previous years, daily catches fluctuated dramatically. The effects of the U.S. commercial fishery in Taku Inlet were observable as fish wheel catches were typically lower between Thursday and Saturday weekly, suggesting that the average travel time between Taku Inlet and Canyon Island was three to four days.

In 2012, the total pink salmon catch in the fish wheels at Canyon Island was 5,826 (Table 1; Appendix B.1a), 51.5% below the 2002 to 2011 average. The peak daily catch (590 fish) occurred on July 25. The fish wheel catch of chum salmon was 232. The total catch was 19.6% below the 2002 to 2011 average. The peak daily catch of chum salmon (18 fish) occurred on August 23 (Appendix B.1a). The

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[3] The aluminum baskets were experimentally used in 1996. Previous programs were constrained by low water conditions, particularly in the fall, which would not effectively turn the fish wheels.

total fish wheel catches of steelhead and Dolly Varden were 24 and 257 fish respectively. The catch of steelhead was 80.4% below the 2002 to 2011 average and the catch of Dolly Varden was 20.3% below average.

In 2013, the total pink salmon catch in the fish wheels at Canyon Island was 4,666 (Table 1; Appendix B.1b), 61.2% below the 2003 to 2012 average. The peak daily catch of pink salmon (497 fish) occurred on July 16. The fish wheel catch of chum salmon was 269 fish, 7.6% below the 2003 to 2012 average. The peak daily catch of chum salmon (33 fish) occurred on August 30 (Appendix B.1b). The total fish wheel catches of steelhead and Dolly Varden in 2013 were 11 and 188 fish respectively. The catch of steelhead was 90.5% below the 2003 to 2012 average of 112. The catch of Dolly Varden was 38.6% above the 2003 to 2012 average.

Catches of chum, steelhead and, to a minor extent Dolly Varden, were reduced due to the early fish wheel demobilization in both 2012 and 2013.

Tagging and Recovery Data

2012

Of the 4,441 sockeye salmon caught in the Taku fish wheels in 2012, 4,161 were tagged (93.7%). Only jack sockeye salmon (fish smaller than approximately 350 mm MEF that have spent only one year at sea) or sockeye with noticeable injuries were not tagged. Daily numbers of sockeye caught and tagged are listed in Appendix B.1a. Recoveries downstream (U.S. personal use and D-111 fishery) of Canyon Island numbered 12 (0.003% of tags applied), leaving 4,149 available for recapture in Canadian fisheries. The Canadian commercial fishery recaptured 873 tagged sockeye and accounted for 99.5% of the total sockeye tags recovered or observed in upstream fisheries (Table 2a). Four tags were recaptured in the Canadian aboriginal fishery. Tags were also observed in terminal areas, principally Little Trapper, Tatsamenie, and King Salmon lakes. These numbered 248, 461, and 81 respectively. No tags were observed at Kuthai Lake in 2012. The weir counts at these locations were 10,015, 15,605, 5,413 and 2,977 sockeye respectively.

2013

Of the 4,240 sockeye salmon caught in the Taku fish wheels in 2013, 4,011 were tagged (94.6%). Only jack sockeye salmon (fish smaller than approximately 350 mm MEF that have spent only one year at sea) or sockeye with noticeable injuries were not tagged. Daily numbers of sockeye caught and tagged are listed in Appendix B.1b. Recoveries downstream (U.S. personal use and D-111 fishery) of Canyon Island numbered 6 (0.012% of tags applied), leaving 3,664 available for recapture in Canadian fisheries. The Canadian commercial fishery recaptured 862 tagged sockeye and accounted for all of the sockeye tags recovered or observed in upstream fisheries (Table 2b). There was no test fishery in 2013, and the Aboriginal fishery did not recover any sockeye tags. Tags were also observed in terminal areas, principally Little Trapper, Tatsamenie, Kuthai, and King Salmon lakes. These numbered 94, 262, 33 and 14 respectively. The escapements to these locations numbered 4,840, 10,166, 1,195 and 493 sockeye respectively.

Escapement Estimates

2012

Ratios of tagged to untagged sockeye salmon in the Canadian commercial, test and catch-and-release gillnet fisheries were used to estimate the magnitude of the inriver run of sockeye salmon that passed Canyon Island during the period of June 10 to September 9, 2012. Fish wheel CPUE for sockeye was used to expand the inriver run estimate for periods of low tag recovery and effort (statistical weeks 22-23 and 35-37).

A total of 877 tags with corresponding recovery date information were returned from 30,208 sockeye salmon examined in the Canadian fisheries (Table 3a). Recovery data from statistical weeks 25 and 26, (June 17 through June 30), 27 and 28 (July 1 through July 14), and 34 through 38 (August 19 through September 22) were pooled due to statistically similar tagging ratios or low fishery/tagging effort. Tagging and recovery data were grouped into 9 and 8 strata, respectively (Table 4a).

Using a maximum likelihood Darroch estimator, we estimated that 155,590 sockeye salmon passed Canyon Island between June 10 and September 9. The approximate 95% confidence interval associated with this estimate is 142,119 to 169,060 fish. To estimate the total run of sockeye salmon that passed before the period of the mark-recapture estimate, the estimate was expanded by using fish wheel CPUE. Since CPUE data was not available after September 9, the 2002-2011 median CPUE was used to expand for this period. Using these methods, it was estimated that an additional 539 and 748 sockeye passed Canyon Island prior to June 10 and after September 9, respectively. Downriver of the U.S./Canadian border, the U.S. inriver personal use fishery catch was estimated at 1,287 sockeye using a tag return expansion method based on the current inriver commercial marked fraction, and personal survey returns logged into the ADFG ALEX database. The total estimate of sockeye salmon run migrating past Canyon Island was 156,877. This estimate is 21.3% above the 2002 to 2011 average of 129,313 sockeye salmon (Table 5; Figure 4).

The Taku River sockeye salmon run above Canyon Island was exploited by the Canadian fisheries at an estimated rate of 19.3%, compared to a 2002-2011 average of 17.3% (range 12.8% to 23.0%; Table 5). After removal of 30,062, and 169 sockeye salmon by the Canadian commercial, and Aboriginal fisheries respectively from the estimated escapement to the Canada/U.S. border, the spawning escapement totaled an estimated 126,646 fish (Table 4a). This is 18.7% above the 2002-2011 average of 106,987 sockeye salmon.

The escapement estimate does not include two groups of sockeye salmon that spawn in the drainage: (1) fish that spawn in streams located downriver from Canyon Island, and (2) jack sockeye salmon. The number of sockeye salmon spawning downstream from Canyon Island is unknown but presumed to be small; spawning has been observed annually in lower tributaries of the lower Taku River (i.e. Fish Creek, Sockeye Creek, and Yehring Creek) during annual aerial and foot surveys (McGregor, personal communication; Figure 1). The contribution of jacks can represent a sizable portion of the Taku River run; the contribution of jack (one ocean) sockeye salmon to the Canyon Island fish wheel catches from 2002 to 2011 averaged 3.3% (range 0.3% to 9.1%; Table 6). However, in 2012 the contribution of jacks was 1.7%.

2013

Ratios of tagged to untagged sockeye salmon in the Canadian commercial and Aboriginal gillnet fisheries were used to estimate the magnitude of the inriver run of sockeye salmon that passed Canyon Island during the period of June 16 to September 9, 2013. Fish wheel CPUE for sockeye was used to expand the inriver run estimate for the periods prior to statistical week 25, when there was no tag recovery, and after statistical week 37, when tag application had ceased.

A total of 862 tags with corresponding recovery date information were returned from 25,204 sockeye salmon examined in the Canadian fisheries (Table 3b). Recovery data from statistical weeks 25- 26 (June 16 to June 29), 29 - 31 (July 14 to August 3), 32 – 33 (August 4 to August 17), and 36 – 37 (September 1 to September 14) were pooled due to statistically similar tagging ratios or low fishery/tagging effort. Tagging and recovery data were grouped into 12 rows and 8 columns, (Table 4b).

Using a maximum likelihood Darroch estimator, we estimated that 96,928 sockeye salmon passed Canyon Island between June 16 and September 9. The approximate 95% confidence interval associated with this estimate is 90,835 to 103,020 fish. To estimate the total run of sockeye salmon that passed before the period of the mark-recapture estimate, the estimate was expanded by using fish wheel CPUE. Since CPUE data was not available after September 9, as in 2012 the 2002 - 2011 median CPUE was used to expand for this period. Using these methods, it was estimated that an additional 8,622 and 469 sockeye passed Canyon Island prior to June 16 and after September 9, respectively. Downriver of the U.S./Canadian border, the U.S. inriver personal use fishery catch was estimated at 1,371 sockeye using a tag return expansion method based on the current inriver commercial marked fraction, and personal survey returns logged into the ADFG ALEX database. The total estimate of sockeye salmon run migrating past Canyon Island was 106,020. This estimate is 19.1% below the 2003 to 2012 average of 131,157 sockeye salmon (Table 5; Figure 4).

The Taku River sockeye salmon run above Canyon Island was exploited by the Canadian fisheries at an estimated rate of 23.7%, compared to a 2003-2012 average of 16.9% (range 12.8% to 22.3%; Table 5). After removal of 25,125, and 99 sockeye salmon by the Canadian commercial, and Aboriginal fisheries, respectively, from the estimated escapement to the Canada/U.S. border, the spawning escapement amounted to an estimated 80,796 fish (Table 4b). This is 24.5% below the 2003-2012 average of 109,318 sockeye salmon.

The escapement estimate does not include two groups of sockeye salmon that spawn in the drainage: (1) fish that spawn in streams located downriver from Canyon Island, and (2) jack sockeye salmon. The number of sockeye salmon spawning downstream from Canyon Island is unknown but presumed to be small; spawning has been observed annually in lower tributaries of the lower Taku River (i.e. Fish Creek, Sockeye Creek, and Yehring Creek) during annual aerial and foot surveys (McGregor, personal communication; Figure 1). The contribution of jacks can represent a sizable portion of the Taku River run; the contribution of jack (one ocean) sockeye salmon to the Canyon Island fish wheel catches from 2003 to 2012 averaged 3.2% (range 0.3% to 9.1%; Table 6). In 2013 the contribution of jacks was 6.6%.

A necessary assumption of the population estimation technique used is that all fish in a particular recovery stratum, whether tagged or untagged, have the same capture probability. A factor that could violate this assumption is that tagging and recapture gear are selective for different sized fish. Based on length frequency distributions of sockeye salmon tagged at the fish wheels and of tagged sockeye recovered in the commercial fishery it is apparent that the fish wheels tend to capture a higher proportion of smaller fish or the fishery captures a higher percentage of large fish.

In past years (Kelley et al. 1996, McGregor et al. 1991) the possible effects of size selectivity on the sockeye salmon population estimate were assessed by stratifying tagging and recovery data by size class. Results for those years demonstrate that the mark-recapture estimates are robust in respect to fish length differences between the tagging and recapture events. The summed abundance estimates obtained for large and small sockeye salmon separately were not significantly different than the pooled estimates. Based on those results the 2012 mark-recapture data was not examined by fish size.

Migratory Timing

2012

The mean date (July 25) of the sockeye salmon migration in 2012 was 4 days later than the 2002-2011 average (Table 7). The standard deviation was slightly less (16.5 days in 2012 versus an average of 18.9 days); meaning the run was more compressed than average. Migratory timing statistics (mean date July 24; standard deviation 7.9 days) showed the pink salmon run timing was two days later than average and slightly more compressed. The migratory timing relative to average for chum salmon is more difficult to assess because the duration of fish wheel operations has varied between years and has failed to cover the complete migration of this species. Assuming fish wheel CPUE in 2012 was reflective of the run, the mean date of migration was August 27 (standard deviation 11.2 days). However, it is likely that this assumption is less valid than usual due to the earlier than average fish wheel demobilization in 2012.

2013

The mean date (July 14) of the sockeye salmon migration in 2013 was 9 days earlier than the 2003-2012 average (Table 7). The standard deviation was slightly more (20.6 days in 2013 versus an average of 18.7 days); meaning the run was less compressed than average. Migratory timing statistics (mean date July 18; standard deviation 7.6 days) showed the pink salmon run timing was 4 days earlier than average and slightly more compressed. The migratory timing relative to average for chum salmon is more difficult to assess because the duration of fish wheel operations has varied between years and has failed to cover the complete migration of this species. Assuming fish wheel CPUE in 2013 was reflective of the run, the mean date of migration was August 28 (standard deviation 10.0 days). However, as in 2012, it is likely that this assumption is less valid than usual due to the earlier than average fish wheel demobilization.

Sockeye Salmon Stock Timing

2012

The timing of three individual stock groups of sockeye salmon past Canyon Island in 2012 was determined using recoveries of tagged fish from enumeration weirs (Table 8a; Figure 5a). These were weirs on the outlet streams of Little Trapper Lake (248 tags), Tatsamenie Lake (461 tags), King Salmon Lake (81 tags). No tags were recovered from Kuthai Lake in 2012.

The King Salmon Lake stock migrated past Canyon Island the earliest of these four stocks examined. These fish were passing Canyon Island from statistical weeks 24 to 30 (June 10 to July 28). The peak of the King Salmon Lake migration took place during statistical week 27 (July 1 to July 7).

Little Trapper Lake sockeye salmon peaked during statistical week 29 (July 15 to July 21). They had the most protracted run timing, being present at Canyon Island from statistical weeks 26 to 34 (June 24 to August 25).

The Tatsamenie Lake stock exhibited the latest return timing; tagged fish bound for this system were present at Canyon Island between statistical weeks 27 to 34 (July 1 to August 25). The peak migration for Tatsamenie Lake sockeye occurred during statistical week 31 (July 29 to August 4).

2013

The timing of four individual stock groups of sockeye salmon past Canyon Island in 2013 was determined using recoveries of tagged fish from enumeration weirs (Table 8b; Figure 5b). These were

weirs on the outlet streams of Kuthai Lake (33 tags), King Salmon Lake (14 tags), Little Trapper Lake (93 tags), and Tatsamenic Lake (264 tags).

The Kuthai Lake stock migrated past Canyon Island the earliest of these four stocks examined. These fish were passing Canyon Island from statistical weeks 23 to 28 (June 9 to July 13). The peak of the King Salmon Lake migration took place during statistical week 26 (June 23 to June 29).

King Salmon Lake sockeye salmon also peaked during statistical week 26. They were present at Canyon Island from statistical weeks 24 to 28 (June 24 to July 13).

Little Trapper Lake sockeye salmon peaked during statistical week 29 (July 14 to July 20). They were present at Canyon Island from statistical weeks 25 to 32 (June 16 to August 10).

The Tatsamenic Lake stock had both the latest and most protracted return timing; tagged fish bound for this system were present at Canyon Island between statistical weeks 27 to 36 (June 30 to September 7). The peak migration for Tatsamenic Lake sockeye occurred during statistical week 31 (July 28 to August 3).

Inriver Sockeye Salmon Migration Rates

2012

Inriver travel times of four lake stocks could be determined from the recovery of tagged fish at enumeration weirs as described in the previous section (Table 9a). Inriver travel times from Canyon Island for the King Salmon Lake, Little Trapper Lake and Tatsamenic Lake stocks are shown in Figure 6a. Travel times averaged 31.2 days for both the King Salmon and Tatsamenic stocks, and 29.0 days for the Little Trapper stock.

Migration rates generally increased over the course of the run. Little Trapper Lake fish tagged in statistical week 27 averaged 36.0 days in transit while those tagged in statistical week 31 averaged 27.2 days. For the Tatsamenic stock, fish tagged in statistical week 29 averaged 33.1 days in transit while fish tagged in statistical week 34 averaged 26.9 days. King Salmon Lake fish tagged in statistical week 26 averaged 30.0 in transit while those tagged in statistical week 29 averaged 24.88 days. Kuthai Lake fish tagged in statistical week 26 averaged 36.4 days in transit, while those tagged in statistical week 29 averaged 22.5 days.

2013

Inriver travel times of four lake stocks could be determined from the recovery of tagged fish at enumeration weirs as described in the previous section (Table 9b). Inriver travel times from Canyon Island for the Kuthai, King Salmon Lake, Little Trapper Lake and Tatsamenic Lake stocks are shown in Figure 6b. Travel times averaged 38.9, 31.2, 32.6 and 37.3 days for each of these respective stocks.

Migration rates generally increased over the course of the run. Little Trapper Lake fish tagged in statistical week 27 averaged 35.3 days in transit while those tagged in statistical week 31 averaged 28.0 days. For the Tatsamenic stock, fish tagged in statistical week 28 averaged 45.0 days in transit while fish tagged in statistical week 33 averaged 30.9 days. King Salmon Lake fish tagged in statistical week 25 averaged 34.8 days in transit while those tagged in statistical week 26 averaged 22.0 days. Kuthai Lake fish tagged in statistical week 24 averaged 41.7 days in transit, while those tagged in statistical week 27 averaged 38.5 days.

Age, Length, and Sex Composition

2012

The age and sex compositions, by sex and time period, of the Canyon Island fish wheel catches of sockeye and chum salmon in 2012 are summarized in Appendices C.1a and C.2b. Lengths at age are presented in Tables 10 and 12.

For sockeye salmon, age-1.2 fish were most prevalent (49.0%) with age-1.3 fish comprising 46.7%, age-2.2 9.7%, age-0.2 4.4%, age-2.3 1.6%, age-0.3 9.4%, and very small numbers of age-0.1, 1.1, 0.4, and 1.4 fish (Table 6). The lengths of age 1.2 and 1.3 sockeye salmon exceeded the 2002 to 2011 averages (Table 10). Females comprised 56.3% of the fish wheel catch of sockeye salmon (Appendix C.1a).

Fish wheel catches of chum salmon were primarily comprised of age-0.4 (52.7%) fish, which is higher than the 2002-2011 average of 36.3% (Table 11). Age-0.3 fish constituted 46.3% of the fish wheel catch, lower than the 59.7% average. Female chum salmon were more prevalent (57.6%) than males (Appendix C.2a). The average lengths at age for chum salmon passing Canyon Island were 595, 646, and 678 mm (MEF) for age 0.2, 0.3, and 0.4 fish respectively; these were all greater than the 2002 to 2011 averages (Table 12).

2013

The age and sex compositions, by sex and time period, of the Canyon Island fish wheel catches of sockeye and chum salmon in 2013 are summarized in Appendices C.1b and C.2b. Lengths at age are presented in Tables 10 and 12.

For sockeye salmon, age-1.3 fish were most prevalent (53.8%) with age-1.2 fish comprising 22.7%, age-1.1 5.1%, age-0.2 3.5%, age-2.3 5.6%, age-0.3 5.9%, and very small numbers of age-0.1, 2.2, 0.4, and 1.4 fish (Table 6). The lengths of age 1.2 and 1.3 sockeye salmon exceeded the 2003 to 2012 averages (Table 10). Females comprised 49.9% of the fish wheel catch of sockeye salmon (Appendix C.1b).

Fish wheel catches of chum salmon were primarily comprised of age-0.4 (50.0%) fish, which is higher than the 2003-2012 average of 36.2% (Table 11). Age-0.3 fish constituted 44.7% of the fish wheel catch, lower than the 59.8% average. Male chum salmon were more prevalent (54.5%) than females (Appendix C.2b). The average lengths at age for chum salmon passing Canyon Island were 640, 670, and 680 mm (MEF) for age 0.3, 0.4, and 0.5 fish respectively; these were all greater than the 2003 to 2012 averages (Table 12).

DISCUSSION

The accuracy of mark-recapture studies in providing estimates of abundance is dependent on the degree to which the underlying assumptions of the analytical methods used are satisfied. We have chosen to use a stratified Darroch type estimator for our Taku River sockeye abundance estimates because we have different capture probabilities in the tagging and recovery strata due, primarily, to fluctuations in river level. In estimating the abundance of adult sockeye salmon in the Taku River we assumed: (a) tagging of adult sockeye salmon was in proportion to their numbers immigrating over time; (b) no

sockeye salmon entered or left the system between the tagging and recovery events or sockeye salmon that made up the population of the capture strata have a non-zero probability of recapture during the recovery event; (c) no tag-induced mortality occurred; (d) the probability of recovering sockeye salmon is independent of its tagged/untagged status. Assumptions underlying this model, outlined above, have been examined at various times during the course of this project (Kelley et al. 1997, McGregor et al. 1991).

With respect to assumption (a), tagging efforts at the Taku River fish wheels and recovery efforts at the Canadian commercial and test fisheries were conducted on a frequent basis through the season. Both of the fish wheels were strictly maintained and adjusted throughout the entire sockeye salmon run. The wheels operated 24-hours per day except during equipment breakdowns; however it is known that river conditions affect the fishing efficiencies of both wheels. Recovery efforts were conducted a minimum of twice per week throughout the season, but water conditions can also affect the efficiency of commercial and test fishery set and drift nets. We are able to work around these variations in gear efficiency by using the Darroch stratified estimator for generating abundance estimates; this allows the probabilities of capture in tagging and recovery strata to vary across time but not within these strata.
It was likely that assumption (b) was violated in recent years of the Taku sockeye mark–recapture program because typically there are significant differences in the cumulative distribution function of length between fish sampled at the fish wheels and at the recovery location. Smaller fish were more prevalent in fish wheel samples than among the recovery samples. Stratification of mark–recapture data by size would remove possible bias in population estimates caused by differences in capture probabilities due to fish size (Bernard and Hansen 1992). In past studies, summed abundance estimates obtained for large and small sockeye salmon were not significantly different than the pooled estimates (Andel and Boyce, 2012). Based on those results the mark-recapture data for 2012 and 2013 was not examined by fish size. We were able to make some correction for this possible bias by completely removing smaller "jack" salmon (less than or equal to 360 mm MEF length) from tag and recovery data.

We were able to assess the short-term loss of tags caused by physical breakage or shedding. Fish that lose their spaghetti tags are readily identifiable by the presence of entrance and exit holes just below the dorsal fin created during tag application. Those holes serve as a secondary mark. In the fish wheels, no sockeye or coho salmon were found throughout the season that had the needle hole "secondary mark" and no spaghetti tag. These results are consistent with those observed in previous years. In addition, in 2012 and 2013, 2,310 and 2,219 fish respectively were examined for tagging needle marks in the Canadian commercial and test fisheries after tags had been removed by fishers. The number of tagging needle marks was compared with tag recovery rates, and found to be close (in 2012, 3.2% versus 2.9%, and in 2013, 4.9% versus 3.4%) (Appendix D). We therefore believe that significant breakage or shedding of tags among sockeye subjected to the inriver fishery is minimal. The close proximity of the fishery to the tagging site (4 km) results in a very short travel time between the two locations.

Fish wheels were not modified in 2012 or 2013 and functioned effectively. As in recent years, a 2-basket configuration was used for the entire season.

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Table 1. Canyon Island fish wheel dates of operation and catches of sockeye, pink, chum, steelhead, and Dolly Varden, 1984 to 2013.

Year	Dates of Operation	Sockeye	Pink	Chum	Steelhead	Dolly Varden
1984	6/15-9/18	2,334	20,751	316	NA	NA
1985	6/16-9/21	3,601	27,670	1,376	NA	NA
1986	6/14-8/25	5,808	7,256	80	14	2,716
1987	6/15-9/20	4,307	42,786	1,533	38	868
1988	5/12-9/19	3,292	3,982	1,089	37	701
1989	5/5-10/1	5,650	31,189	645	34	1,308
1990	5/3-9/23	6,091	13,358	748	33	1,433
1991	6/8-10/15	5,102	23,553	1,063	135	326
1992	6/20-9/24	6,279	9,252	189	22	241
1993	6/12-9/29	8,975	1,625	345	30	375
1994	6/10-9/21	6,485	27,100	367	107	584
1995	5/4-9/27	6,228	1,712	218	65	509
1996	5/3-9/20	5,919	21,583	388	65	681
1997	5/3-10/1	5,708	4,962	485	102	454
1998	5/2-9/15	4,230	23,347	179	120	323
1999	5/14-9/28	4,639	23,503	164	76	330
2000	5/14-10/3	5,865	6,529	423	159	244
2001	5/27-9/27	6,201	9,134	250	125	196
2002	5/19-9/14	5,812	5,672	205	90	419
2003	5/20-10/4	5,970	15,491	262	49	285
2004	5/12-10/4	6,255	8,464	414	313	63
2005	5/5-10/4	3,953	15,839	258	79	293
2006	5/20-9/30	5,296	21,726	466	47	341
2007	5/18-9/30	7,664	12,405	462	63	425
2008	5/16-9/23	3,804	4,704	350	124	423
2009	5/12-9/27	3,388	9,225	214	249	19
2010	5/9-8/31	3,160	8,868	94	176	452
2011	5/22-9/25	3,584	17,774	160	34	503
2012	5/21-9/15	4,441	5,826	232	24	257
2013	5/15-9/9	4,240	4,666	269	11	188
Average(02-11)		4,889	12,017	289	122	322
Average(03-12)		4,752	12,032	291	116	306

Table 2a. Summary of Taku River sockeye tag recoveries by location and species, 2012.

	Tags Recovered	Tags Observed Only	Total	Fish Inspected	Tag Ratio	Percent Tags Observed
Commercial Fishery	873		873	30,056	0.029	0.518
Aboriginal Fishery	4		4	146	0.027	0.002
Food Fish	4		4	169	0.024	0.002
King Salmon Lake[a]	72	9	81	5,413	0.015	0.048
Kuthai Lake				182	0.000	0.000
Little Trapper Lake	149	99	248	10,015	0.025	0.147
Tatsamenie Lake	266	195	461	15,605	0.030	0.273
Nahlin River	3		3	178	0.017	0.002
Fish Creek (U.S.)						
Yehring Creek (U.S.)						
U.S. downstream	12		12			
Total	1,383	303	1,686	61,764		

[a] Incomplete count.

Table 2b. Summary of Taku River sockeye tag recoveries by location and species, 2013.

	Tags Recovered	Tags Observed Only	Total	Fish Inspected	Tag Ratio	Percent Tags Observed
Commercial Fishery	862		862	25,125	0.034	0.608
Aboriginal Fishery				79	0.000	0.000
King Salmon Lake	13	1	14	493	0.028	0.010
Kuthai Lake	33		33	1,195	0.028	0.023
Little Trapper Lake	94	36	130	4,840	0.027	0.092
Tatsamenie Lake	264	108	372	10,166	0.037	0.263
Taku River mainstem						
Nahlin River						
Tulsequah River						
Fish Creek (U.S.)						
Yehring Creek (U.S.)						
U.S. downstream	6		6			
Total	1,272	145	1,417	41,898		

Table 3a. Tagging and recovery data from the 2012 Taku River sockeye salmon mark-recapture program. Data includes number of sockeye salmon tagged and recovered in the Canadian in-river fisheries by statistical week (downstream recoveries excluded).

Statistical Week of Tagging	Statistical Week of Recovery																Total Tags Recovered	Total Tags Applied	Tag Ratio Recovered/ Applied
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38			
22																	0	10	0.000
23																	0	6	0.000
24			10	4													14	88	0.159
25				3	2												5	67	0.075
26				2	25												27	182	0.148
27					12	13	1										26	355	0.073
28						30	20	3		1							54	351	0.154
29							51	44	1	1	1						98	548	0.179
30								113	75	11	1						200	888	0.225
31									16	81	16	5	3				121	615	0.197
32										84	34	5	2	2			127	439	0.289
33											73	39	6	2			120	314	0.382
34												53	6	4	2		65	225	0.289
35													14	2			16	53	0.302
36														4			4	18	0.222
37																	0	2	0.000
Total	0	0	10	9	39	43	72	160	92	178	125	102	31	14	2	0	877	4,161	0.211

Sockeye Examined[a]:	Total
Test Fishery	0
Can. Comm. Catch	30,062
Aboriginal Fishery	146
Total	30,208

[a] Equals the number examined for Canyon Island tags.

Table 3b. Tagging and recovery data from the 2013 Taku River sockeye salmon mark-recapture program. Data includes number of sockeye salmon tagged and recovered in the Canadian in-river fisheries by statistical week (downstream recoveries excluded).

Statistical Week of Tagging	Statistical Week of Recovery													Total Tags Recovered	Total Tags Applied	Tag Ratio Recovered/ Applied
	25	26	27	28	29	30	31	32	33	34	35	36	37			
25	6	58	15	0	1	0	0	0	0	0	0	0	0	80	570	0.140
26	0	11	42	4	0	0	0	0	0	0	0	0	0	57	346	0.165
27	0	0	14	7	1	0	0	0	0	0	0	0	0	22	230	0.096
28	0	0	0	18	44	0	0	0	0	0	0	0	0	62	298	0.208
29	0	0	0	0	130	74	4	2	1	0	0	0	0	211	647	0.326
30	0	0	0	0	0	75	69	6	3	0	0	0	0	153	501	0.305
31	0	0	0	0	0	0	101	40	9	2	2	1	0	155	522	0.297
32	0	0	0	0	0	0	0	22	21	6	3	0	0	52	214	0.243
33	0	0	0	0	0	0	0	0	9	12	0	0	1	22	162	0.136
34	0	0	0	0	0	0	0	0	0	11	6	0	1	18	66	0.273
35	0	0	0	0	0	0	0	0	0	0	25	0	0	25	64	0.391
36	0	0	0	0	0	0	0	0	0	0	0	3	1	4	34	0.118
37	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	0.250
Total	6	69	71	29	176	149	174	70	43	31	36	4	4	862	3,658	0.236

Sockeye Examined[a]:														Total
Test Fishery														0
Can. Comm. Catch	651	611	897	766	7688	5366	5340	1721	870	535	517	108	55	25,125
Aboriginal Fishery							66	7	2	4				79
Total	651	611	897	766	7,688	5,366	5,406	1,728	872	539	517	108	55	25,204

[a] Equals the number examined for Canyon Island tags.

Table 4a. Pooled-strata tagging and recovery data used to calculate mark-recapture estimates of the inriver sockeye salmon run past Canyon Island, 2012.

Statistical Week of Tagging	Statistical Week of Recovery								Total Tags Recovered	Total Tags Applied	Tag Ratio
	25-26	27-28	29	30	31	32	33	34-38			
24-26	19	27							46	337	0.136
27		25	1						26	355	0.073
28		30	20	3		1			54	351	0.154
29			51	44	1	1	1		98	548	0.179
30				113	75	11	1		200	888	0.225
31					16	81	16	8	121	615	0.197
32						84	34	9	127	439	0.289
33							73	47	120	314	0.382
34-36								85	85	296	0.287
Total	19	82	72	160	92	178	125	149	877	4,143	0.212
Harvest Examined For Tags[a]	987	3,756	2,577	7,019	4,657	5,439	3,428	2,339	30,202		
Marked Fraction	0.020	0.022	0.029	0.023	0.020	0.034	0.038	0.068	0.030		
Above Border Run Estimate	3,186	38,348	21,747	9,413	43,957	23,837	6,909	8,192	155,590		
Fish Wheel CPUE Expansion[b]									1,287		
Total Above Border Run									156,877		
U.S. Personal Use Harvest[d]									1,287		
95% Lower C.I.	-	27,586	11,484	-	11,620	18,730	4,316	6,716	142,119		
95% Upper C.I.	9,811	49,109	32,009	41,704	76,295	28,945	9,502	9,668	169,060		
Above Border Catch[c]									30,231		
Spawning Escapment	2,199	34,592	19,170	2,394	39,300	18,398	3,481	5,853	126,646		

[a] Includes Canadian commercial and Aboriginal fishery catches

[b] Expansion based on fish wheel CPUE

[c] Includes commercial fish harvested prior to SW25 and Aboriginal fish harvested near headwaters.

[d] Not subtracted from above border run estimate.

Table 4b. Pooled-strata tagging and recovery data used to calculate mark-recapture estimates of the inriver sockeye salmon run past Canyon Island, 2013.

Statistical Week of Tagging	Statistical Week of Recovery								Total Tags Recovered	Total Tags Applied	Tag Ratio
	25-26	27	28	29-31	32-33	34	35	36-37			
25	64	15	0	1	0	0	0	0	80	94	0.851
26	11	42	4	0	0	0	0	0	57	164	0.348
27	0	14	7	1	0	0	0	0	22	209	0.105
28	0	0	18	44	0	0	0	0	62	151	0.411
29-30	0	0	0	352	8	4	0	0	364	212	1.717
31	0	0	0	101	49	2	2	1	155	565	0.274
32	0	0	0	0	43	6	3	0	52	461	0.113
33	0	0	0	0	9	12	0	1	22	579	0.038
34	0	0	0	0	0	11	6	1	18	292	0.062
35	0	0	0	0	0	0	25	0	25	173	0.145
36	0	0	0	0	0	0	0	4	4	71	0.056
37	0	0	0	0	0	0	0	1	1	135	0.007
Total	75	71	29	499	109	35	36	8	862	3,106	0.278
Harvest Examined For Tags[a]	1,262	897	766	18,460	2,600	539	517	163	25,204		
Marked Fraction	0.063	0.086	0.039	0.028	0.044	0.069	0.075	0.052	0.035		
Above Border Run Estimate	9,210	5,438	8,697	57,182	10,190	3,694	1,284	1,233	96,928		
Fish Wheel CPUE Expansion[c]									9,092		
Total Above Border Run									106,020		
Aboriginal Fishery[c]	0	0	0	66	9	4	0	0	99		
U.S. Personal Use Harvest[d]									1,371		
95% Lower C.I.	6,746	3,227	4,753	52,154	7,343	2,038	905	234	90,835		
95% Upper C.I.	11,674	7,649	12,642	62,210	13,036	5,350	1,663	2,231	103,020		
Spawning Escapment	7,948	4,541	7,931	38,656	7,581	3,151	767	1,070	80,796		

[a] Includes Canadian commercial and Aboriginal fishery catches.

[b] Expansion based on fish wheel CPUE.

[c] Includes sockeye harvested near headwaters.

[d] Not subtracted from above border run estimate.

Table 5. Historical sockeye salmon above border abundance, above border harvests, and escapement for the Taku River, 1984 to 2013[a].

Year	Border Escapement	Canadian Commercial and Test Harvest	Canadian Commercial and Test Harvest Rate	Spawning Escapement[b]	Terminal	U.S. Harvest
1984	141,254	27,292	0.193	113,962	198,873	57,619
1985	123,974	14,411	0.116	109,563	198,261	74,287
1986	115,045	14,939	0.130	100,106	175,689	60,644
1987	96,023	13,887	0.145	82,136	150,986	54,963
1988	92,641	12,967	0.140	79,674	118,427	25,785
1989	114,068	18,805	0.165	95,263	177,434	63,366
1990	117,573	21,474	0.183	96,099	226,858	109,285
1991	154,873	25,380	0.164	129,493	260,143	105,271
1992	167,376	29,862	0.178	137,514	288,551	121,176
1993	142,148	33,523	0.236	108,625	284,236	142,089
1994	131,580	29,001	0.220	102,579	229,642	98,063
1995	146,450	32,711	0.223	113,739	238,434	91,984
1996	134,651	42,025	0.312	92,626	322,379	187,727
1997	95,438	24,352	0.255	71,086	174,565	79,127
1998	91,548	19,038	0.208	70,715	139,824	49,832
1999	113,705	20,681	0.182	92,562	176,764	63,058
2000	115,693	27,942	0.242	87,298	246,954	131,262
2001	192,269	47,988	0.250	144,071	396,678	204,433
2002	135,233	31,053	0.230	103,343	251,634	116,401
2003	200,918	32,933	0.171	167,691	328,884	135,494
2004	127,949	20,346	0.159	106,691	204,059	77,012
2005	134,841	21,697	0.161	112,739	188,245	46,090
2006	167,053	21,361	0.128	145,572	233,425	65,828
2007	105,012	17,090	0.163	87,763	170,141	65,129
2008	87,568	19,509	0.223	68,059	163,260	75,692
2009	85,599	11,154	0.130	74,339	119,477	36,380
2010	109,028	20,508	0.188	88,428	154,769	46,818
2011	139,926	24,553	0.175	115,249	208,665	71,804
2012	156,877	30,062	0.192	126,646	181,901	55,255
2013	106,020	25,125	0.237	80,796	180,460	99,664
Average(02-11)	129,313	22,020	0.173	106,987	202,256	73,665
Maximum(02-11)	200,918	32,933	0.230	167,691	328,884	135,494
Minimum(02-11)	85,599	11,154	0.128	68,059	119,477	36,380
S.D.(02-11)	35,570	6,337	0.034	30,883	59,015	31,044
C.V.(02-11)	27.5%	28.8%	19.5%	28.9%	29.2%	42.1%
Average(03-12)	131,477	21,921	0.169	109,318	195,283	67,550
Maximum(03-12)	200,918	32,933	0.223	167,691	328,884	135,494
Minimum(03-12)	85,599	11,154	0.128	68,059	119,477	36,380
S.D.(03-12)	36,614	6,186	0.028	31,451	56,602	27,512
C.V.(03-12)	27.8%	28.2%	16.7%	28.8%	29.0%	40.7%

[a] U.S. catch and run size are preliminary.

[b] Spawning escapement includes removals for Canadian Aboriginal.

Table 6. Historical age composition of sockeye salmon passing Canyon Island, Taku River, 1983 to 2013.

Year	Sample Size	Percent By Age Class													
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	3.2	2.4	3.3
1983	1,574	0.0	0.4	0.0	5.7	16.6	0.0	0.0	62.5	7.6	0.2	7.4	0.0	0.0	0.1
1984	1,583	0.3	2.1	1.8	11.5	15.4	0.2	0.2	57.0	9.2	0.3	2.8	0.0	0.0	0.0
1985	2,437	0.3	6.0	4.1	4.0	17.2	0.4	0.4	53.8	8.7	0.7	4.8	0.0	0.1	0.0
1986	3,468	0.0	2.9	0.4	6.3	29.7	0.1	0.0	50.2	2.4	0.3	8.0	0.0	0.0	0.0
1987	2,987	0.8	1.0	5.0	12.7	17.3	2.0	0.2	54.2	2.3	0.2	4.6	0.0	0.1	0.0
1988	2,450	0.3	6.5	6.2	8.0	29.8	0.3	0.0	38.7	5.6	0.2	4.6	0.1	0.0	0.0
1989	4,272	0.3	3.0	4.2	7.0	19.5	0.4	0.0	58.3	3.3	0.2	4.0	0.0	0.0	0.0
1990	4,489	0.4	4.9	3.6	4.7	26.3	0.2	0.1	48.5	6.4	0.3	4.8	0.0	0.0	0.0
1991	3,594	0.1	7.9	3.3	9.5	31.4	0.8	0.1	37.7	4.9	0.3	4.4	0.0	0.0	0.0
1992	1,678	0.3	7.1	3.0	12.3	26.7	0.7	0.1	41.2	3.8	0.0	5.4	0.0	0.0	0.0
1993	2,593	0.2	4.3	3.2	11.0	15.6	0.7	0.0	55.5	4.9	0.2	4.9	0.0	0.0	0.0
1994	2,789	1.0	5.1	5.2	9.4	17.3	0.1	0.0	55.2	4.0	0.1	3.0	0.0	0.0	0.0
1995	3,461	0.3	14.6	3.0	4.0	32.9	0.1	0.1	36.3	5.8	0.1	3.0	0.0	0.0	0.0
1996	2,659	0.1	3.8	1.3	18.3	17.1	0.1	0.0	51.1	5.9	0.2	2.1	0.0	0.0	0.0
1997	2,787	0.1	1.4	1.8	9.4	27.4	0.2	0.2	44.5	7.3	0.1	7.6	0.1	0.0	0.0
1998	2,429	0.1	2.4	5.2	0.8	19.7	0.3	0.0	60.4	6.9	0.2	4.0	0.0	0.0	0.1
1999	2,261	0.9	4.8	6.5	2.5	39.9	1.1	0.0	30.3	12.1	0.1	1.7	0.0	0.0	0.0
2000	2,305	0.0	6.3	1.2	8.6	34.5	0.2	0.0	42.3	4.6	0.1	2.0	0.0	0.0	0.0
2001	2,145	0.5	2.2	8.3	9.7	21.4	0.3	0.0	53.8	2.1	0.1	1.4	0.0	0.0	0.0
2002	2,460	0.3	8.9	2.8	2.6	37.1	0.0	0.2	43.9	2.0	0.4	1.7	0.0	0.0	0.0
2003	1,982	0.4	6.8	3.5	7.6	24.9	0.1	0.1	54.4	1.1	0.2	1.2	0.0	0.0	0.0
2004	2,232	0.3	7.5	0.7	16.2	30.8	0.0	0.0	39.1	3.4	0.2	1.8	0.0	0.0	0.0
2005	1,724	0.1	4.9	0.2	15.0	24.7	0.0	0.1	50.2	2.7	0.1	2.1	0.0	0.0	0.0
2006	1,862	0.2	8.2	1.4	5.5	27.2	0.1	0.0	47.3	7.5	0.4	2.3	0.0	0.0	0.0
2007	1,767	0.1	7.7	0.7	8.3	39.2	0.1	0.0	36.6	3.2	0.3	3.9	0.0	0.0	0.0
2008	1,578	0.5	7.4	1.8	11.0	20.1	0.1	0.1	54.1	2.6	0.3	2.1	0.0	0.0	0.0
2009	1,333	0.4	8.4	9.5	10.8	20.6	0.4	0.2	44.0	1.4	0.0	4.4	0.0	0.0	0.0
2010	1,356	0.8	8.9	3.8	16.7	22.2	0.1	0.1	40.9	6.3	0.1	0.5	0.0	0.0	0.0
2011	1,779	0.5	7.3	3.5	6.1	15.4	0.4	0.1	56.7	4.2	0.1	5.6	0.0	0.0	0.0
2012	1,526	0.3	4.4	1.3	9.4	49.0	0.1	0.1	23.9	9.7	0.3	1.6	0.0	0.0	0.0
2013	1,997	1.3	3.5	5.1	5.9	22.7	0.3	0.2	53.8	1.4	0.4	5.6	0.0	0.0	0.0
Average (02-11)	1,714	0.4	7.6	2.8	10.0	26.2	0.1	0.1	46.7	3.4	0.2	2.6	0.0	0.0	0.0
SD (02-11)		0.2	1.2	2.7	4.8	7.6	0.2	0.1	6.9	2.1	0.1	1.6	0.0	0.0	0.0
CV (02-11)		58.3%	15.5%	96.6%	48.3%	28.9%	117.6%	86.9%	14.9%	60.0%	63.6%	61.3%	-	-	-
Average (03-12)	1,714	0.4	7.1	2.6	10.7	27.4	0.1	0.1	44.7	4.2	0.2	2.5	0.0	0.0	0.0
SD (03-12)		0.2	1.5	2.7	4.1	10.0	0.2	0.1	10.1	2.8	0.1	1.6	0.0	0.0	0.0
CV (03-12)		57.6%	20.3%	103.9%	38.3%	36.5%	102.5%	86.3%	22.5%	66.0%	61.0%	62.0%	-	-	-

Table 7. Migratory timing statistics of sockeye, pink , and chum salmon past the Canyon Island fish wheels, 1984 to 2013. Timing statistics in 1984 were based on catch, all other years were based on fish wheel CPUE.

	Species					
	Sockeye		Pink		Chum	
Year	Mean Date	S.D.	Mean Date	S.D.	Mean Date	S.D.
1984	7-23	17.6	7-19	9.3	8-14	12.8
1985	7-24	18.1	7-19	8.5	9-8	11.8
1986	7-16	14.2	7-27	5.5	8-7	11.3
1987	7-24	15.8	7-19	9.3	9-8	10.5
1988	7-19	19.5	7-21	9.6	8-31	12.5
1989	7-14	20.1	7-18	7.8	9-13	15.9
1990	7-20	18.8	7-23	8.9	8-30	15.1
1991	7-24	20.6	7-23	6.6	9-11	13.0
1992	7-25	14.4	7-24	7.2	8-28	13.5
1993	7-21	16.9	7-15	8.9	9-7	14.4
1994	7-23	20.2	7-24	10.1	9-2	15.6
1995	7-22	22.0	7-14	7.8	9-3	9.8
1996	7-21	18.9	7-23	6.5	8-27	14.0
1997	7-26	23.9	7-14	10.0	9-5	11.6
1998	7-18	21.1	7-24	7.9	9-4	8.7
1999	7-18	19.5	7-24	7.9	9-3	14.5
2000	7-17	20.8	7-25	8.7	8-30	16.9
2001	7-20	18.1	7-18	8.4	9-2	13.4
2002	7-9	18.6	7-20	7.6	8-31	12.3
2003	7-19	16.5	7-15	7.8	9-3	12.2
2004	7-18	19.5	7-24	8.3	9-4	19.2
2005	7-20	20.5	7-15	7.7	9-5	16.4
2006	8-4	18.6	7-26	7.8	9-4	13.2
2007	7-29	16.6	7-26	8.4	9-7	10.7
2008	7-22	20.6	7-25	10.0	8-28	14.7
2009	7-20	15.9	7-24	9.9	9-6	17.5
2010	7-24	21.8	7-25	9.4	9-5	11.0
2011	7-23	20.3	7-24	7.8	9-9	12.1
2012	7-25	16.5	7-24	7.9	8-27	11.2
2013	7-14	20.6	7-18	7.6	9-28	10.0
Average(02-11)	7-21	18.9	7-22	8.5	9-4	13.9
Average(03-12)	7-23	18.7	7-22	8.5	9-3	13.8

Table 8a. Weekly and cumulative proportions of three individual sockeye salmon stocks passing Canyon Island in 2012, based on spawning ground tag recoveries expanded by fish wheel indices (fish wheel CPUE).

			Little Trapper Lake		Tatsamenie Lake		King Salmon Lake	
Statistical Week	Week Starting	Week Ending	Weekly Proportion	Cumul. Proportion	Weekly Proportion	Cumul. Proportion	Weekly Proportion	Cumul. Proportion
22	27-May	02-Jun						
23	03-Jun	09-Jun						
24	10-Jun	16-Jun					0.009	0.009
25	17-Jun	23-Jun					0.000	0.009
26	24-Jun	30-Jun	0.032	0.032			0.224	0.232
27	01-Jul	07-Jul	0.145	0.177	0.004	0.004	0.371	0.604
28	08-Jul	14-Jul	0.199	0.376	0.007	0.011	0.213	0.817
29	15-Jul	21-Jul	0.298	0.674	0.046	0.057	0.161	0.978
30	22-Jul	28-Jul	0.080	0.754	0.149	0.206	0.022	1.000
31	29-Jul	04-Aug	0.008	0.762	0.296	0.502		
32	05-Aug	11-Aug	0.000	0.762	0.281	0.783		
33	12-Aug	18-Aug	0.204	0.966	0.142	0.926		
34	19-Aug	25-Aug	0.034	1.000	0.074	1.000		
35	26-Aug	01-Sep						
36	02-Sep	08-Sep						
37	09-Sep	15-Sep						

Table 8b. Weekly and cumulative proportions of four individual sockeye salmon stocks passing Canyon Island in 2013, based on spawning ground tag recoveries expanded by fish wheel indices (fish wheel CPUE).

			Little Trapper Lake		Tatsamenie Lake		Kuthai Lake		King Salmon Lake	
Statistical Week	Week Starting	Week Ending	Weekly Proportion	Cumul. Proportion	Weekly Proportion	Cumul. Proportion	Weekly Proportion	Cumul. Proportion	Weekly Proportion	Cumul. Proportion
22	26-May	01-Jun								
23	02-Jun	08-Jun					0.082	0.082		
24	09-Jun	15-Jun					0.157	0.238	0.064	0.064
25	16-Jun	22-Jun	0.009	0.009			0.221	0.459	0.273	0.337
26	23-Jun	29-Jun	0.021	0.030			0.365	0.824	0.410	0.747
27	30-Jun	06-Jul	0.141	0.171	0.007	0.007	0.148	0.971	0.182	0.929
28	07-Jul	13-Jul	0.303	0.475	0.014	0.022	0.029	1.000	0.071	1.000
29	14-Jul	20-Jul	0.376	0.851	0.195	0.216				
30	21-Jul	27-Jul	0.072	0.922	0.234	0.450				
31	28-Jul	03-Aug	0.064	0.987	0.360	0.810				
32	04-Aug	10-Aug	0.013	1.000	0.075	0.885				
33	11-Aug	17-Aug			0.086	0.971				
34	18-Aug	24-Aug			0.007	0.978				
35	25-Aug	31-Aug			0.009	0.987				
36	01-Sep	07-Sep			0.013	1.000				
37	08-Sep	14-Sep								

Table 9a. Inriver migration timing for three Taku River sockeye salmon stocks, 2012[a].

Stock	Week	Travel Time	SD	SE	N	95% C.I.
L. Trapper	26	39.33	5.03	2.91	3	5.70
	27	36.00	2.97	0.66	20	1.30
	28	31.39	4.14	0.67	38	1.32
	29	26.52	4.81	0.71	46	1.39
	30	23.26	4.22	0.71	35	1.40
	31	27.20	3.83	1.71	5	3.36
	32	19.00	4.24	3.00	2	5.88
	Average	28.96	4.2		21	
Tatsamenie	27	42.50	0.71	0.50	2	0.98
	28	38.00	2.83	2.00	2	3.92
	29	33.06	5.81	1.45	16	2.85
	30	28.66	3.74	0.51	53	1.01
	31	26.77	4.66	0.51	82	1.01
	32	27.23	6.24	0.86	52	1.69
	33	26.19	4.60	0.83	31	1.62
	34	26.85	4.88	0.94	27	1.84
	Average	31.16	4.2		33	
King Salmon	24	47.00			1	
	25					
	26	36.36	7.89	2.38	11	4.66
	27	33.31	5.45	1.07	26	2.10
	28	27.75	6.58	1.47	20	2.88
	29	20.17	5.20	1.50	12	2.94
	30	22.50	2.12	1.50	2	2.94
	Average	31.18	5.4		12	

[a] The average travel time for each weekly period was derived from the number of days the tagged fish took to travel between the tagging site (Canyon Island) and the recovery location (weir site).

Table 9b. Inriver migration timing for four Taku River sockeye salmon stocks, 2013[a].

Stock	Week	Travel Time	SD	SE	N	95% C.I.
L. Trapper	25	46.00			1	
	26	39.50	2.12	1.50	2	2.94
	27	35.33	3.68	1.06	12	2.08
	28	31.09	4.39	0.76	33	1.50
	29	32.52	6.17	1.07	33	2.10
	30	27.33	7.42	3.03	6	5.94
	31	28.00	5.79	2.59	5	5.07
	32	21.00			1	
	Average	32.60	4.9		93	
Tatsamenie	27	70.50	19.09	13.50	2	26.46
	28	45.00	2.12	0.95	5	1.86
	29	41.53	4.24	0.57	55	1.12
	30	38.13	6.91	0.87	63	1.71
	31	32.27	4.07	0.43	90	0.84
	32	31.83	7.88	1.86	18	3.64
	33	30.91	8.69	1.81	23	3.55
	34	34.50	2.12	1.50	2	2.94
	35	26.33	1.15	0.67	3	1.31
	36	21.67	3.51	2.03	3	3.97
	Average	37.27	6.0		264	
King Salmon	24	40.00			1	
	25	34.75	8.42	4.21	4	8.25
	26	32.00	4.58	2.05	5	4.02
	26	22.00	4.24	3.00	2	5.88
	27	31.00			1	
	Average	31.95	5.7		13	
Kuthai	23	49.00	3.61	2.08	3	4.08
	24	41.67	3.67	1.50	6	2.94
	25	40.63	6.32	2.24	8	4.38
	26	38.55	7.90	2.38	11	4.67
	27	38.50	4.65	2.33	4	4.56
	28	25.00			1	
	Average	38.89	5.2		33	

[a] The average travel time for each weekly period was derived from the number of days the tagged fish took to travel between the tagging site (Canyon Island) and the recovery location (weir site).

Table 10. Historical length (MEF) at age composition of sockeye salmon passing Canyon Island, Taku River, 1983 to 2013.

	Sample	Length At Age Class												
Year	Size	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	2.4	3.2	3.3
1983	1,573		447		577	469			578	522	618	582			
1984	1,572	297	445	315	575	476	320	610	576	511	580	589			
1985	2,422	309	457	337	572	486	372	609	579	510	597	590	625		
1986	3,362		449	305	584	493	310		582	491	598	581			
1987	2,923	316	460	319	587	463	329	610	592	494	565	592	650		
1988	2,422	313	443	319	576	482	324		578	480	600	578			
1989	4,254	315	442	340	578	468	334		591	488	619	589			
1990	4,432	316	427	326	570	470	322	612	574	485	578	576	555		
1991	3,581	313	442	322	561	463	321	610	569	482	602	572			
1992	1,667	351	431	328	564	467	345	585	568	482		569			
1993	2,582	316	440	327	555	470	333		558	507	573	556			
1994	2,784	329	431	327	559	455	325		557	497	585	561			
1995	3,435	324	455	329	563	481	357	625	562	509	630	569			
1996	2,649	300	472	323	581	489	338		583	524	607	587			
1997	2,770	310	461	332	579	503	339	581	580	514	585	574		490	
1998	2,427	313	445	327	578	483	346		569	510	579	575			555
1999	2,251	328	446	317	565	485	326	555	568	515	612	575		540	
2000	2,300	310	460	324	583	503	329		582	508	610	581			
2001	2,140	308	449	324	581	498	340	600	586	519	572	567			
2002	2,453	299	437	334	583	473	320	614	589	522	609	595			
2003	1,966	336	458	340	570	475	340	570	578	492	582	593			
2004	2,231	338	463	332	580	500		585	570	505	588	591			
2005	1,842	345	457	331	564	472		600	563	490	585	563			
2006	1,858	325	450	334	564	484			570	515	574	565			
2007	1,834	326	465	337	585	499	353		585	523	602	589			
2008	1,574	309	445	326	586	487	345		583	506	600	592			
2009	3,610	326	448	336	592	467	345	662	577	517	595	582		525	
2010	1,766	319	437	335	565	477	340	560	563	494	580	556			
2011	1,779	320	447	338	568	466	336	610	576	508	603	573			
2012	1,521	323	453	335	578	499	330	600	580	521	591	590			
2013	1,971	327	442	348	571	502	335	611	581	515	583	580			
Average(02-11)	2,091	324	451	334	576	480	340	600	575	507	592	580		525	
SD(02-11)		13.7	9.9	4.0	10.6	12.2	10.3	33.8	8.9	12.2	11.6	14.5			
CV(02-11)		4.2%	2.2%	1.2%	1.8%	2.5%	3.0%	5.6%	1.5%	2.4%	2.0%	2.5%			
Average(03-12)	1,998	327	452	334	575	483	341	598	575	507	590	579		525	
SD(03-12)		15.1	8.8	5.6	9.6	13.5	11.0	31.6	8.4	11.7	13.6	12.5			
CV(03-12)		4.6%	2.0%	1.7%	1.7%	2.8%	3.2%	5.3%	1.5%	2.3%	2.3%	2.1%			

Table 11. Historical age composition of chum salmon passing Canyon Island fish wheels, Taku River, 1983 to 2013

Year	Sample Size	Percent by Age Class 0.2	0.3	0.4	0.5	0.6
1983	24	8.3	45.8	54.2	8.3	0.0
1984	280	2.5	85.0	13.6	0.0	0.0
1985	728	0.4	68.1	31.9	0.0	0.0
1986	64	0.0	51.6	51.6	0.0	0.0
1987	1075	1.0	48.6	48.8	2.0	0.0
1988	853	0.0	30.4	68.5	1.5	0.0
1989	574	0.5	77.4	19.5	3.1	0.3
1990	636	0.3	23.0	76.7	0.5	0.3
1991	missing data					
1992	163	0.0	56.4	37.4	8.0	0.0
1993	278	0.7	22.3	75.9	2.5	0.0
1994	310	0.6	32.6	63.2	4.8	0.0
1995	192	2.1	19.8	75.5	4.7	0.0
1996	351	1.1	68.4	23.4	7.1	0.0
1997	425	0.9	56.2	42.4	0.5	0.0
1998	152	0.7	27.6	67.8	3.9	0.0
1999	151	2.0	84.1	13.9	0.0	0.0
2000	273	0.0	75.5	24.5	0.0	0.0
2001	207	1.0	44.9	54.1	0.0	0.0
2002	144	0.7	45.8	53.5	0.0	0.0
2003	230	2.7	72.9	23.1	1.3	0.0
2004	305	0.2	67.8	31.9	0.1	0.0
2005	198	1.0	54.0	44.9	0.0	0.0
2006	375	1.1	66.7	31.2	1.1	0.0
2007	377	1.6	54.1	42.4	1.9	0.0
2008	283	0.4	77.4	20.5	1.8	0.0
2009	188	0.5	49.5	49.5	0.5	0.0
2010	95	3.2	36.8	47.4	0.0	0.0
2011	172	1.2	72.1	18.6	0.6	0.0
2012	203	0.5	46.3	52.7	0.5	0.0
2013	246	0.0	44.7	50.0	5.3	0.0
Average(02-11)	237	1.3	59.7	36.3	0.7	
SD(02-11)		1.0	13.5	12.9	0.7	
CV(02-11)		0.8	0.2	0.4	1.0	
Average(03-12)	243	1.2	59.8	36.2	0.8	
SD(03-12)		1.0	13.4	12.7	0.7	
CV(03-12)		0.8	0.2	0.4	0.9	

Table 12. Historical length (MEF) at age composition of chum salmon passing Canyon Island, Taku River, 1983 to 2013.

Year	Sample Size	Length at Age Class 0.2	0.3	0.4	0.5	0.6
1983	24	599	651	658	714	
1984	279	615	630	683		
1985	727	592	658	680		
1986	63		640	666		
1987	1,061	579	642	668	668	
1988	845		642	675	690	
1989	571	587	628	669	678	680
1990	634	655	629	666	690	600
1991	missing data					
1992	163		614	656	667	
1993	277	510	598	638	616	
1994	310	660	610	645	660	
1995	192	556	632	652	663	
1996	350	595	642	662	684	
1997	424	651	640	673	693	
1998	151	600	634	662	703	
1999	149	615	644	664		
2000	273		650	680		
2001	207	528	623	665		
2002	144	610	649	669		
2003	227	564	612	644	650	
2004	634	633	623	657	660	
2005	250	605	646	665		
2006	374	615	647	681	692	
2007	377	581	633	669	663	
2008	283	545	649	689	665	
2009	188	545	621	662	695	
2010	95	505	626	655		
2011	172	582	615	649	640	
2012	203	595	646	678	635	
2013	246		640	670	680	
Average(02-11)	274	579	632	664	666	
SD(02-11)		39.3	14.6	13.8	20.4	
CV(02-11)		6.8%	2.3%	2.1%	3.1%	
Average(03-12)	280	577	632	665	663	
SD(03-12)		38.2	14.3	14.5	21.9	
CV(03-12)		6.6%	2.3%	2.2%	3.3%	

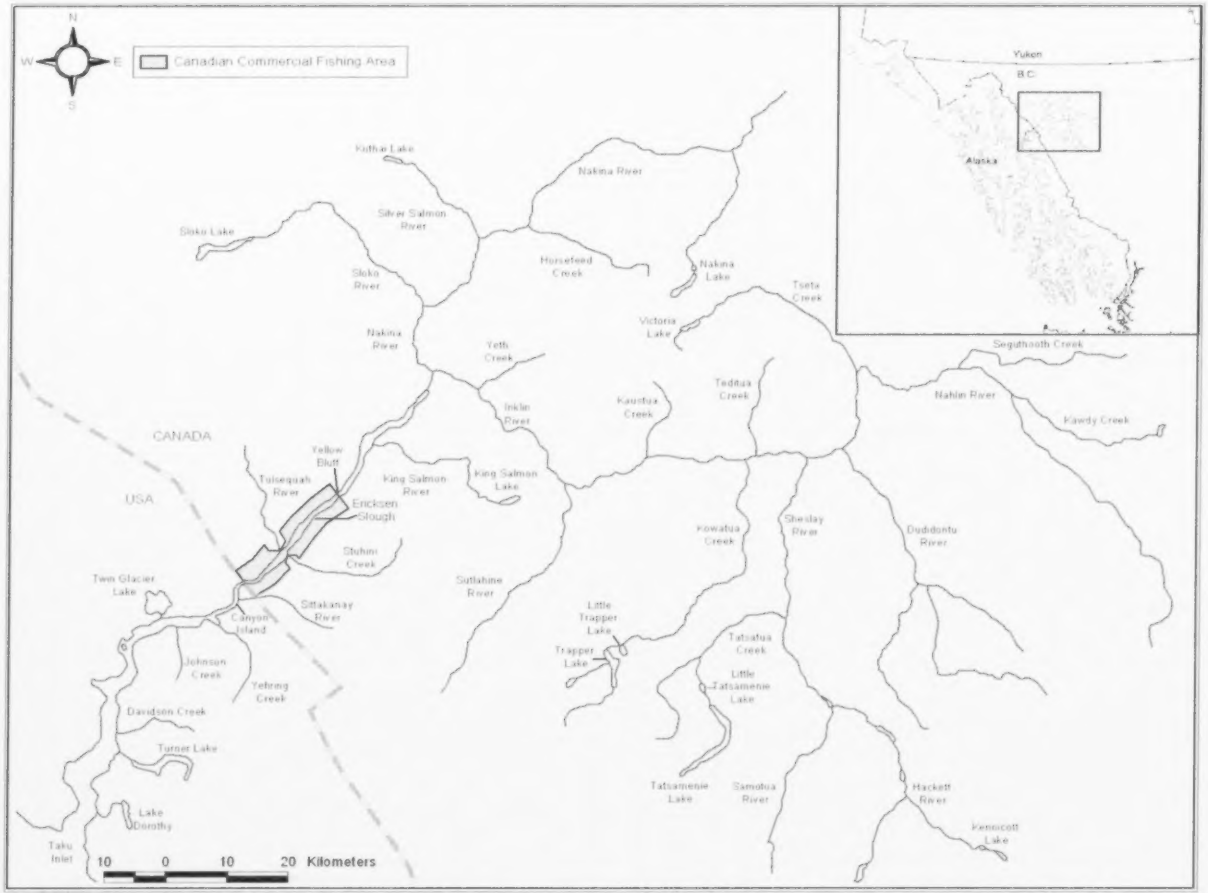


Figure 1. Taku River drainage, with location of tagging and recovery sites.

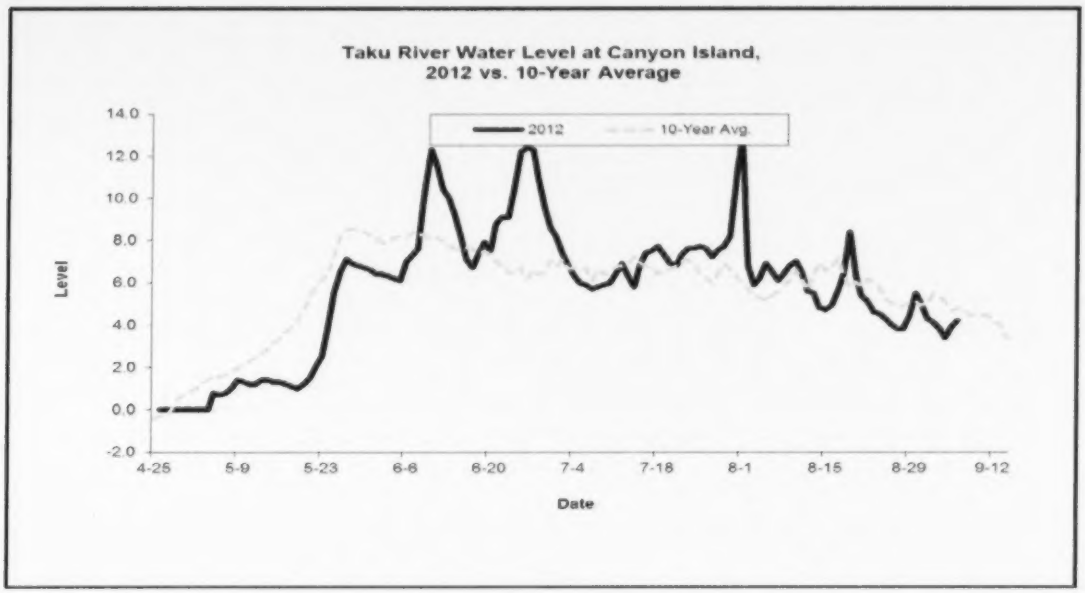


Figure 2a. Water levels at Canyon Island, Taku River, 2012 vs. 2002-2011 average.

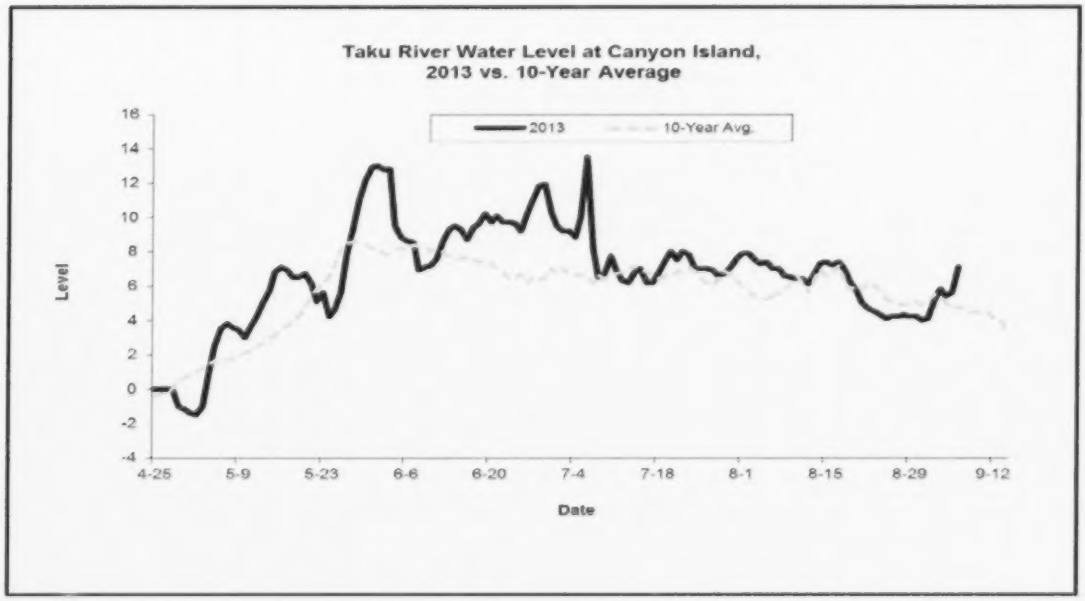
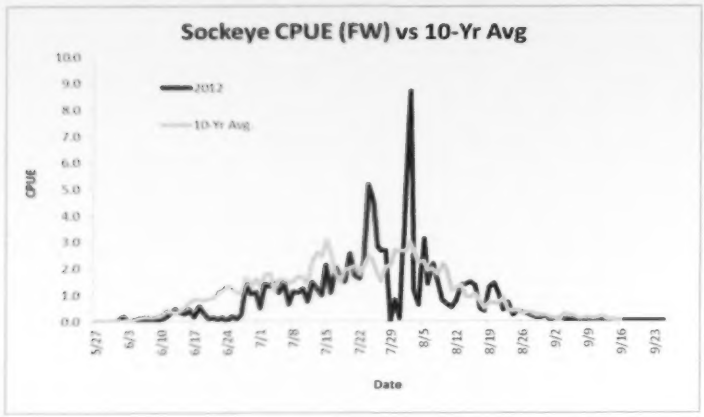
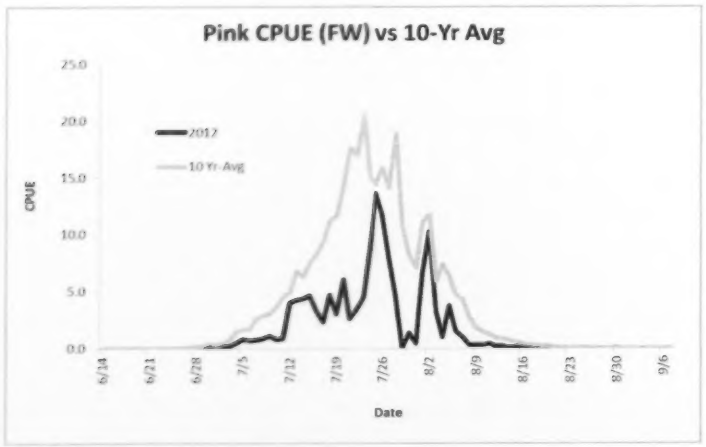


Figure 2b. Water levels at Canyon Island, Taku River, 2013 vs. 2003-2012 average.





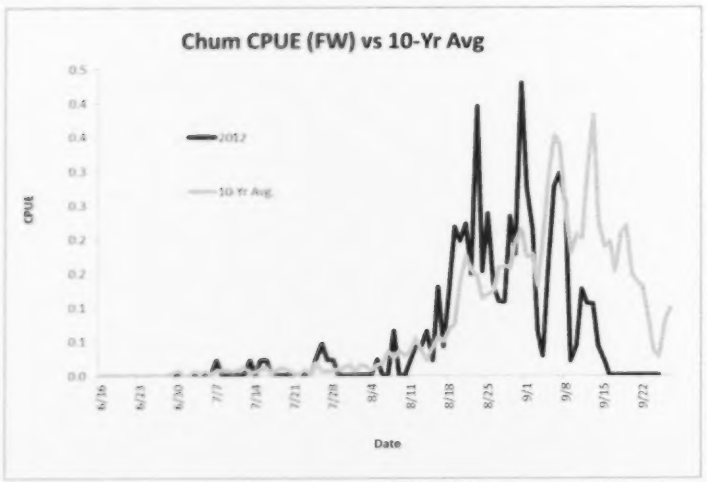
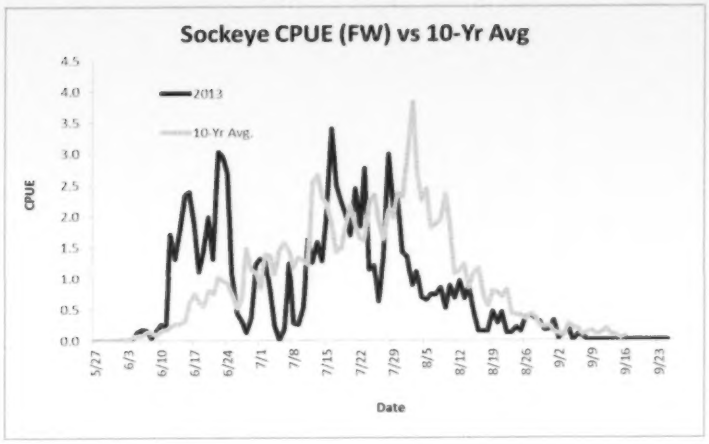
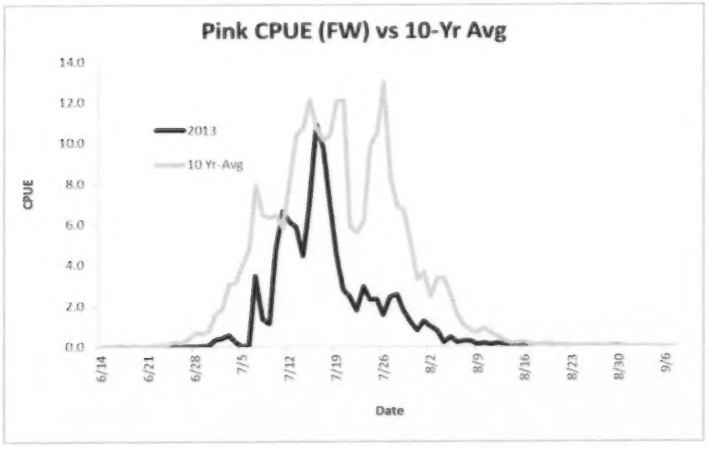


Figure 3a. Fish wheel CPUE for sockeye, pink, and chum salmon at Canyon Island, 2012.





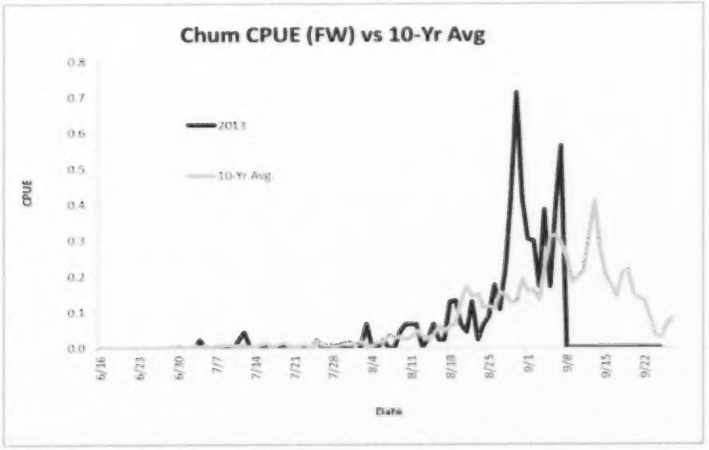


Figure 3b. Fish wheel CPUE for sockeye, pink, and chum salmon at Canyon Island, 2013.

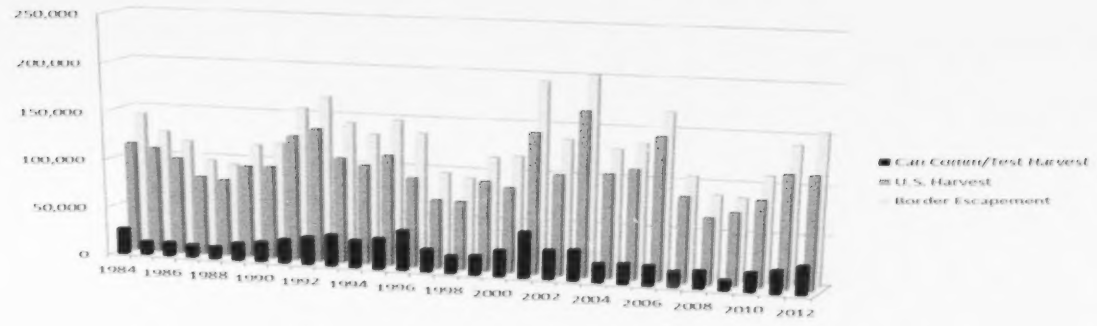


Figure 4a. Historical sockeye mark-recapture abundance estimates above the U.S./Canada border including Canadian inriver harvests and escapements for Taku River sockeye, 1984-2012.

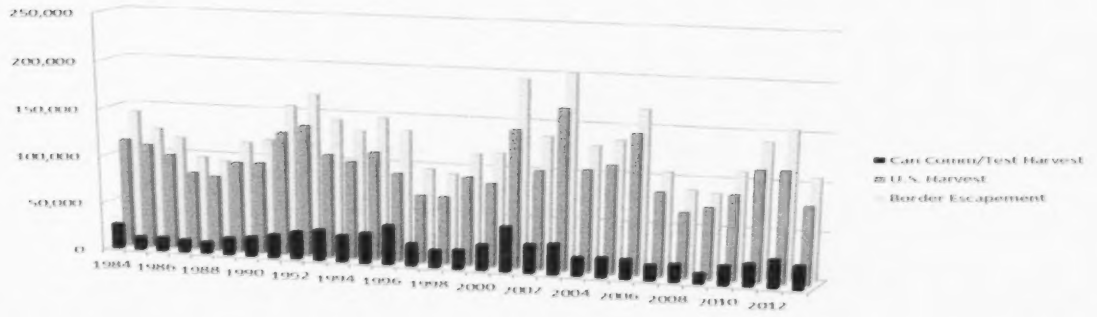


Figure 4b. Historical sockeye mark-recapture abundance estimates above the U.S./Canada border including Canadian inriver harvests and escapements for Taku River sockeye, 1984-2013.

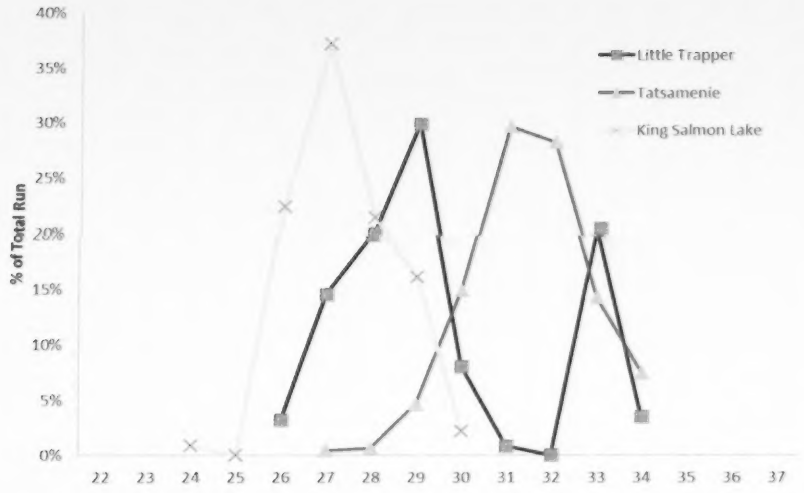


Figure 5a. Run timing of three sockeye salmon stock groups passing Canyon Island, 2012.

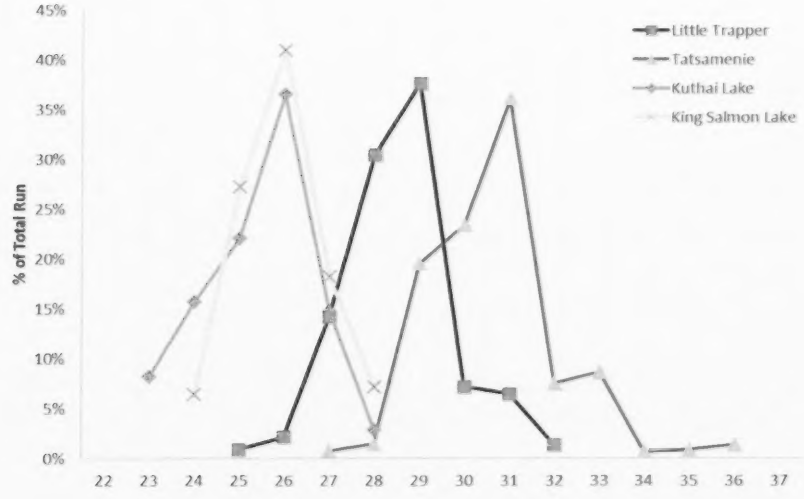
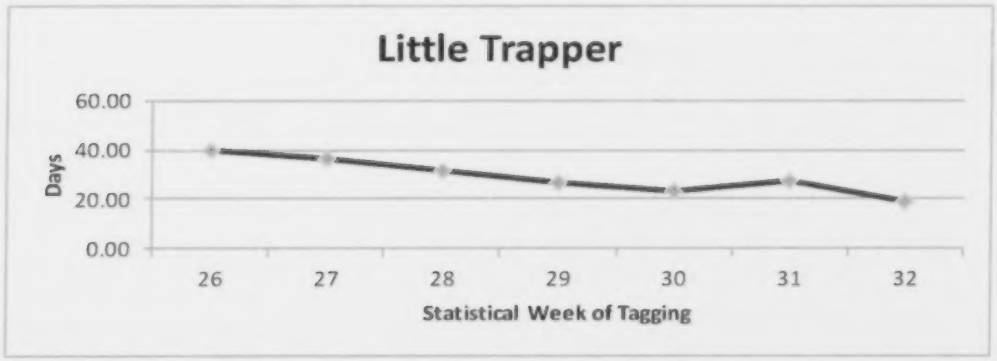
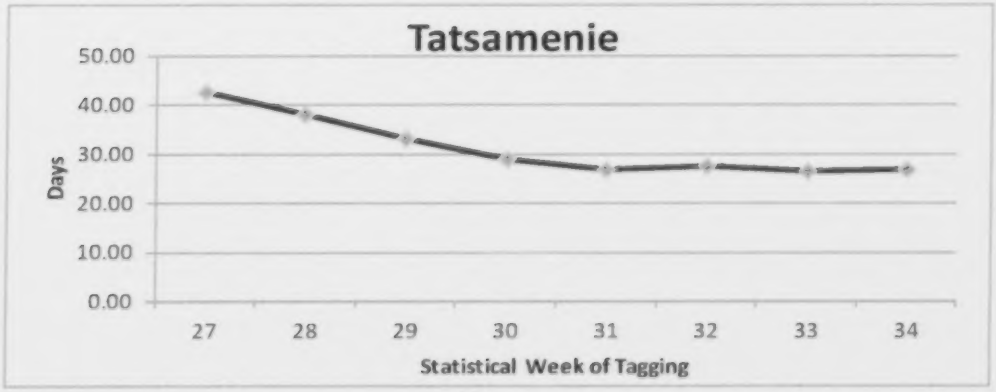


Figure 5b. Run timing of four sockeye salmon stock groups passing Canyon Island, 2013.





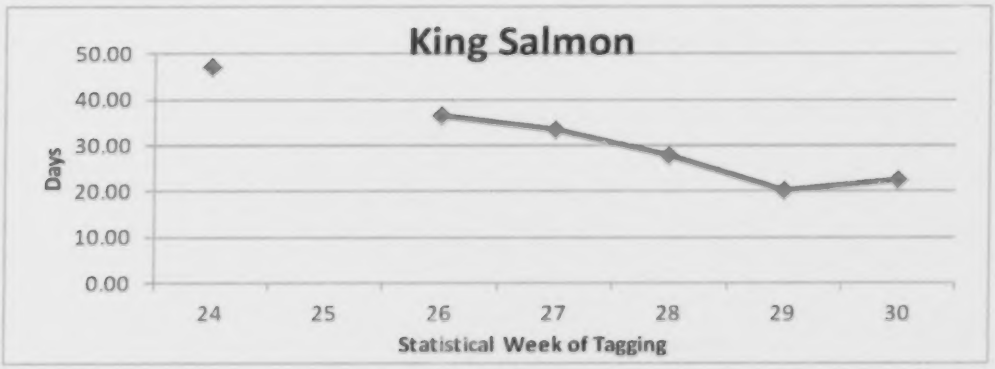


Figure 6a. Mean travel times for tagged sockeye salmon between Canyon Island and three upriver locations, 2012.

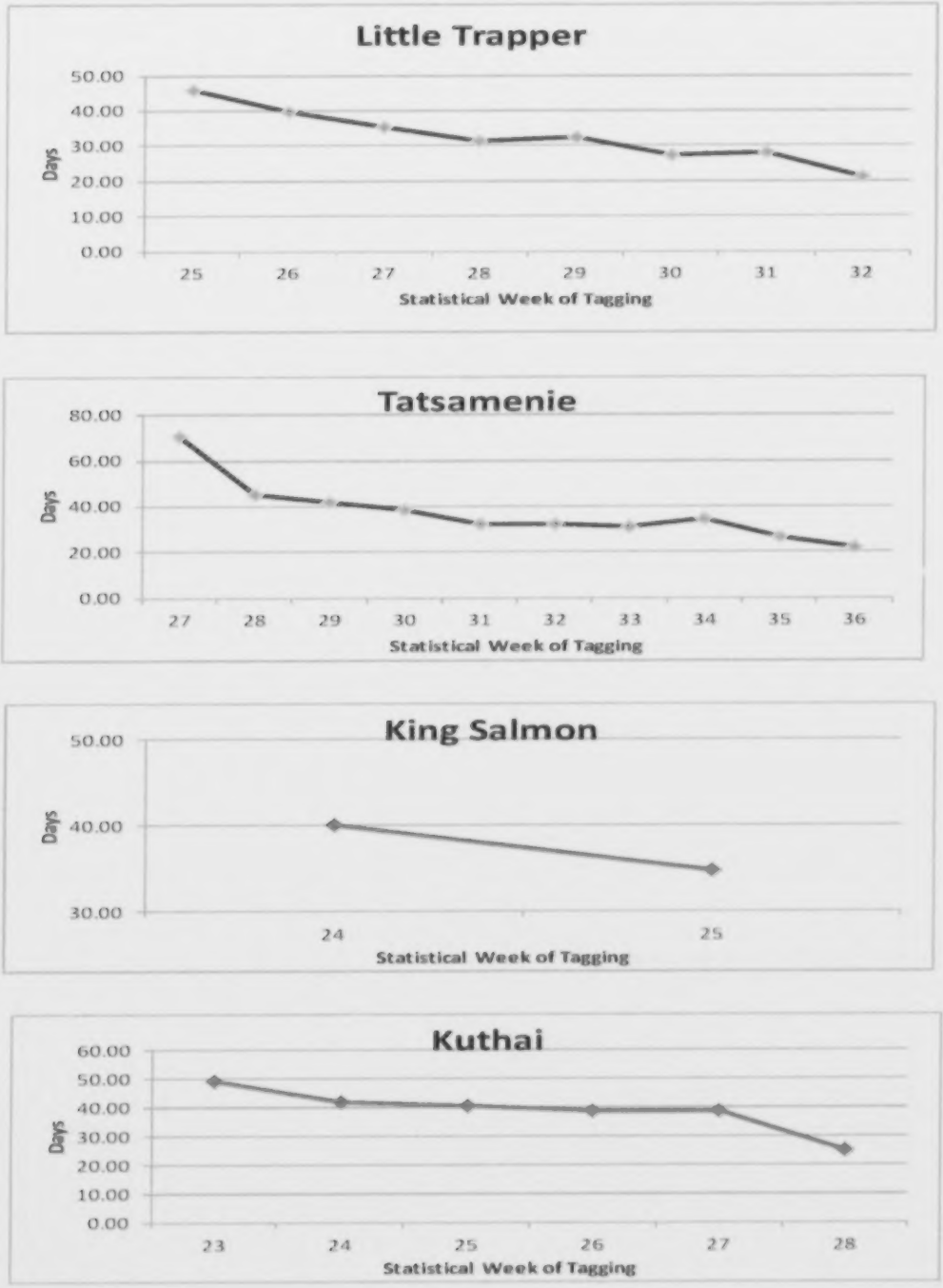


Figure 6b. Mean travel times for tagged sockeye salmon between Canyon Island and four upriver locations, 2013.

Appendix A1a. Inclusive dates for statistical weeks, 2012.

2012 Statistical Week Calendar					
Stat Week	**From**	**Through**	**Stat Week**	**From**	**Through**
1	01-Jan	07-Jan	28	08-Jul	14-Jul
2	08-Jan	14-Jan	29	15-Jul	21-Jul
3	15-Jan	21-Jan	30	22-Jul	28-Jul
4	22-Jan	28-Jan	31	29-Jul	04-Aug
5	29-Jan	04-Feb	32	05-Aug	11-Aug
6	05-Feb	11-Feb	33	12-Aug	18-Aug
7	12-Feb	18-Feb	34	19-Aug	25-Aug
8	19-Feb	25-Feb	35	26-Aug	01-Sep
9	26-Feb	03-Mar	36	02-Sep	08-Sep
10	04-Mar	10-Mar	37	09-Sep	15-Sep
11	11-Mar	17-Mar	38	16-Sep	22-Sep
12	18-Mar	24-Mar	39	23-Sep	29-Sep
13	25-Mar	31-Mar	40	30-Sep	06-Oct
14	01-Apr	07-Apr	41	07-Oct	13-Oct
15	08-Apr	14-Apr	42	14-Oct	20-Oct
16	15-Apr	21-Apr	43	21-Oct	27-Oct
17	22-Apr	28-Apr	44	28-Oct	03-Nov
18	29-Apr	05-May	45	04-Nov	10-Nov
19	06-May	12-May	46	11-Nov	17-Nov
20	13-May	19-May	47	18-Nov	24-Nov
21	20-May	26-May	48	25-Nov	01-Dec
22	27-May	02-Jun	49	02-Dec	08-Dec
23	03-Jun	09-Jun	50	09-Dec	15-Dec
24	10-Jun	16-Jun	51	16-Dec	22-Dec
25	17-Jun	23-Jun	52	23-Dec	29-Dec
26	24-Jun	30-Jun	53	30-Dec	05-Jan
27	01-Jul	07-Jul			

Appendix A1b. Inclusive dates for statistical weeks, 2013.

2013 Statistical Week Calendar					
Stat Week	**From**	**Through**	**Stat Week**	**From**	**Through**
1	01-Jan	05-Jan	28	07-Jul	13-Jul
2	06-Jan	12-Jan	29	14-Jul	20-Jul
3	13-Jan	19-Jan	30	21-Jul	27-Jul
4	20-Jan	26-Jan	31	28-Jul	03-Aug
5	27-Jan	02-Feb	32	04-Aug	10-Aug
6	03-Feb	09-Feb	33	11-Aug	17-Aug
7	10-Feb	16-Feb	34	18-Aug	24-Aug
8	17-Feb	23-Feb	35	25-Aug	31-Aug
9	24-Feb	02-Mar	36	01-Sep	07-Sep
10	03-Mar	09-Mar	37	08-Sep	14-Sep
11	10-Mar	16-Mar	38	15-Sep	21-Sep
12	17-Mar	23-Mar	39	22-Sep	28-Sep
13	24-Mar	30-Mar	40	29-Sep	05-Oct
14	31-Mar	06-Apr	41	06-Oct	12-Oct
15	07-Apr	13-Apr	42	13-Oct	19-Oct
16	14-Apr	20-Apr	43	20-Oct	26-Oct
17	21-Apr	27-Apr	44	27-Oct	02-Nov
18	28-Apr	04-May	45	03-Nov	09-Nov
19	05-May	11-May	46	10-Nov	16-Nov
20	12-May	18-May	47	17-Nov	23-Nov
21	19-May	25-May	48	24-Nov	30-Nov
22	26-May	01-Jun	49	01-Dec	07-Dec
23	02-Jun	08-Jun	50	08-Dec	14-Dec
24	09-Jun	15-Jun	51	15-Dec	21-Dec
25	16-Jun	22-Jun	52	22-Dec	28-Dec
26	23-Jun	29-Jun	53	29-Dec	04-Jan
27	30-Jun	06-Jul			

Appendix B.1a. Catches and number tagged of salmon in the fish wheels at Canyon Island, 2012.

		FISHING EFFORT				SOCKEYE					PINK			CHUM			DV		Steelhead	
Stat		FWI	FWI	FWII	FWII	FW Catches		FW Tagged		CPUE	Total Catches		CPUE	Total Catches		CPUE	Total Catches		Total Catches	
Week	Date	Effort	RPM	Effort	RPM	Daily	Cum.	Daily	Cum.	Daily	Daily	Cum.	Daily	Daily	Cum.	Daily	Daily	Cum.	Daily	Cum.
21	21-May			23.50	2.3															
21	22-May	23.25	2.2	23.25	2.4															
21	23-May	23.67	2.3	23.42	2.3												1	1		
21	24-May	23.75	2.7	23.25	2.6												1	2		
21	25-May	23.92	2.7	23.92	2.7												0	2		
21	26-May	22.83	2.8	23.75	2.8												0	2		
22	27-May	23.92	2.5	23.92	2.5												0	2		
22	28-May	23.92	2.5	23.92	2.5												0	2		
22	29-May	23.00	2.3	23.83	2.5												0	2		
22	30-May	21.00	2.4	23.92	2.5												0	2		
22	31-May	23.83	2.3	23.83	2.6												0	2		
22	01-Jun	23.33	2.4	23.58	2.2	3	3	3	3	0.064							0	2		
22	02-Jun	23.67	2.7	23.25	2.8	7	10	7	10	0.149							0	2		
23	03-Jun	23.67	2.6	23.83	2.7	1	11	1	11	0.021							0	2		
23	04-Jun	23.58	2.7	23.50	2.8	2	13	2	13	0.042							0	2		
23	05-Jun	23.75	2.6	23.83	2.7	2	15	2	15	0.042							0	2		
23	06-Jun	23.83	2.5	23.92	2.6	0	15	0	15	0.000							0	2		
23	07-Jun	23.83	2.6	23.92	2.6	1	16	1	16	0.021							0	2		
23	08-Jun	23.75	2.8	23.83	2.7	0	16	0	16	0.000							0	2		
23	09-Jun	23.92	2.9	23.92	2.9	0	16	0	16	0.000							0	2		
24	10-Jun	21.00	3.0	22.83	2.9	3	19	1	17	0.068							0	2		
24	11-Jun	23.67	2.7	23.83	2.6	7	26	7	24	0.147							0	2		
24	12-Jun	23.75	2.9	23.58	2.6	14	40	14	38	0.296							0	2		
24	13-Jun	23.75	2.8	23.00	2.4	21	61	20	58	0.449							1	3		
24	14-Jun	23.58	2.6	23.50	2.7	15	76	15	73	0.319							0	3		
24	15-Jun	23.67	2.5	23.50	2.8	13	89	13	86	0.276							1	4		
24	16-Jun	22.50	2.7	20.83	2.7	18	107	18	104	0.415							0	4		
25	17-Jun	23.67	2.8	23.33	2.8	7	114	7	111	0.149							0	4		
25	18-Jun	23.33	2.5	22.83	2.5	25	139	25	136	0.542							0	4	1	1
25	19-Jun	23.75	2.6	23.42	2.5	15	154	15	151	0.318							0	4	0	1
25	20-Jun	23.92	2.8	23.83	2.7	5	159	5	156	0.105							0	4	0	1
25	21-Jun	22.75	2.6	22.83	2.7	6	165	6	162	0.132							0	4	0	1
25	22-Jun	22.50	2.7	23.92	2.8	3	168	3	165	0.065							0	4	0	1
25	23-Jun	23.83	2.9	23.75	2.9	6	174	6	171	0.126							0	4	0	1
26	24-Jun	23.92	3.0	23.92	3.0	0	174	0	171	0.000							1	5	0	1
26	25-Jun	23.75	3.1	23.75	2.9	9	183	9	180	0.189							1	6	0	1
26	26-Jun	23.67	2.9	23.83	2.5	4	187	4	184	0.084							0	6	0	1
26	27-Jun	23.67	2.7	23.75	2.4	12	199	12	196	0.253							0	6	0	1
26	28-Jun	23.25	2.7	20.17	2.3	61	260	61	257	1.405							0	6	0	1
26	29-Jun	23.25	2.8	23.33	2.1	47	307	47	304	1.009							1	7	0	1
26	30-Jun	23.00	2.3	23.42	2.4	51	358	49	353	1.091							0	7	0	1
27	01-Jul	23.58	2.4	23.50	2.6	23	381	22	375	0.489							1	8	0	1
27	02-Jul	23.42	2.6	22.58	2.4	64	445	61	436	1.391	6	6	0.139				2	10	0	1
27	03-Jul	23.08	2.4	23.12	2.2	60	505	60	496	1.299	9	15	0.195				1	11	0	1
27	04-Jul	23.33	2.2	23.00	2.0	67	572	67	563	1.446	20	35	0.432				4	15	0	1
27	05-Jul	23.83	2.0	23.58	2.0	51	623	50	613	1.076	36	71	0.759				5	20	0	1
27	06-Jul	23.08	2.0	23.58	2.2	69	692	67	680	1.479	29	100	0.622				4	24	0	1
27	07-Jul	23.58	2.3	23.67	2.2	30	722	28	708	0.635	32	132	0.677	1	1	0.021	4	28	0	1
28	08-Jul	23.08	2.5	23.58	2.4	52	774	48	756	1.114	39	171	0.836	0	1	0.000	2	30	1	2
28	09-Jul	23.00	2.4	23.50	2.4	50	824	50	806	1.075	48	219	1.032	0	1	0.000	7	37	0	2
28	10-Jul	23.08	2.5	23.33	2.3	56	880	54	860	1.207	34	253	0.733	0	1	0.000	4	41	0	2
28	11-Jul	23.42	2.5	23.42	2.5	34	914	34	894	0.726	39	292	0.833	0	1	0.000	4	45	0	2

Appendix B.1a (Cont'd). Catches and number tagged of salmon in the fish wheels at Canyon Island, 2012.

		FISHING EFFORT				SOCKEYE					PINK			CHUM			DV		Steelhead	
Stat		FWI	FWI	FWII	FWII	FW Catches		FW Tagged		CPUE	Total Catches		CPUE	Total Catches		CPUE	Total Catches		Total Catches	
Week	Date	Effort	RPM	Effort	RPM	Daily	Cum	Daily	Cum	Daily	Daily	Cum	Daily	Daily	Cum	Daily	Daily	Cum	Daily	Cum
28	12-Jul	23.25	2.5	23.12	2.3	67	981	66	960	1.445	181	476	3.968	0	1	0.000	12	57	0	2
28	13-Jul	23.00	2.2	23.00	2.1	57	1038	54	1014	1.239	194	670	4.217	1	2	0.022	7	64	0	2
28	14-Jul	22.92	3.0	23.00	2.5	45	1083	45	1059	0.984	199	869	4.334	0	2	0.000	8	72	0	2
29	15-Jul	23.08	2.4	22.50	2.6	96	1179	93	1152	2.106	210	1079	4.607	1	3	0.022	0	72	1	3
29	16-Jul	23.17	2.5	22.66	2.7	49	1228	47	1199	1.066	149	1228	3.251	1	4	0.022	5	77	0	3
29	17-Jul	23.08	2.5	23.00	2.7	93	1321	90	1289	2.018	104	1332	2.257	0	4	0.000	0	77	0	3
29	18-Jul	22.92	2.4	22.92	2.4	75	1396	69	1358	1.636	213	1545	4.647	0	4	0.000	2	79	1	4
29	19-Jul	23.08	3.0	22.50	2.5	67	1463	64	1422	1.470	134	1679	2.948	0	4	0.000	5	84	0	4
29	20-Jul	23.25	2.7	22.50	2.3	116	1579	112	1534	2.536	274	1953	5.989	0	4	0.000	8	92	0	4
29	21-Jul	23.08	2.3	23.00	2.6	79	1658	73	1607	1.714	117	2070	2.539	0	4	0.000	4	96	0	4
30	22-Jul	22.83	2.3	23.17	2.5	73	1731	71	1678	1.587	154	2224	3.348	0	4	0.000	2	98	0	4
30	23-Jul	22.83	2.4	22.67	2.6	102	1833	97	1775	2.242	200	2424	4.396	0	4	0.000	2	100	0	4
30	24-Jul	22.25	2.4	21.83	2.4	226	2059	211	1986	5.127	374	2798	8.485	0	4	0.000	5	105	0	4
30	25-Jul	21.67	2.4	21.83	2.4	194	2253	181	2167	4.460	590	3388	13.563	1	5	0.023	3	108	0	4
30	26-Jul	22.50	2.1	21.50	2.6	123	2376	111	2278	2.795	513	3901	11.659	2	7	0.045	3	111	0	4
30	27-Jul	22.83	2.7	22.33	2.4	120	2496	108	2386	2.657	351	4252	7.772	1	8	0.022	1	112	0	4
30	28-Jul	22.33	2.5	22.42	2.7	119	2615	109	2495	2.699	195	4447	4.358	1	9	0.022	1	113	0	4
31	29-Jul	23.50	2.5	23.50	2.5	0	2615	0	2495	0.000	0	4447	0.000	0	9	0.000	0	113	0	4
31	30-Jul	23.67	2.8	23.00	2.8	37	2652	32	2527	0.793	62	4509	1.328	0	9	0.000	1	114	0	4
31	31-Jul	23.83	2.8	23.83	2.7	5	2657	5	2532	0.105	20	4529	0.420	0	9	0.000	0	114	0	4
31	01-Aug	22.83	2.3	21.42	2.4	204	2861	187	2719	4.618	286	4815	6.463	0	9	0.000	1	115	0	4
31	02-Aug	21.25	2.2	20.75	2.4	365	3226	311	3030	8.690	431	5246	10.262	0	9	0.000	17	132	0	4
31	03-Aug	23.00	2.7	23.42	2.7	54	3280	52	3082	1.163	152	5398	3.274	0	9	0.000	2	134	0	4
31	04-Aug	23.42	2.6	23.58	2.1	29	3309	28	3110	0.617	47	5445	1.000	0	9	0.000	3	137	0	4
32	05-Aug	22.17	2.5	22.92	2.5	141	3450	130	3240	3.127	167	5612	3.704	1	10	0.022	6	143	0	4
32	06-Aug	23.17	2.4	23.50	2.4	65	3515	64	3304	1.393	70	5682	1.500	0	10	0.000	1	144	0	4
32	07-Aug	22.50	2.5	23.17	2.1	100	3615	96	3400	2.190	44	5726	0.963	0	10	0.000	1	145	0	4
32	08-Aug	22.83	2.7	23.42	2.6	70	3685	67	3467	1.514	13	5739	0.281	3	13	0.065	1	146	0	4
32	09-Aug	23.25	2.6	23.58	2.6	36	3721	34	3501	0.769	13	5752	0.278	0	13	0.000	2	148	0	4
32	10-Aug	23.17	2.0	23.58	2.5	31	3752	25	3526	0.663	13	5765	0.278	0	13	0.000	1	149	0	4
32	11-Aug	23.00	2.3	23.67	2.3	24	3776	23	3549	0.514	18	5783	0.386	1	14	0.021	1	150	0	4
33	12-Aug	23.83	2.0	23.67	2.0	37	3813	34	3583	0.779	9	5792	0.189	2	16	0.042	0	150	0	4
33	13-Aug	23.00	2.0	23.58	1.9	64	3877	62	3645	1.374	9	5801	0.193	2	18	0.043	4	154	0	4
33	14-Aug	22.83	1.8	23.50	1.9	64	3941	57	3702	1.381	2	5803	0.043	3	21	0.065	6	160	1	5
33	15-Aug	22.58	2.2	23.58	1.9	68	4009	66	3768	1.473	4	5807	0.087	1	22	0.022	3	163	0	5
33	16-Aug	23.08	2.5	23.50	2.1	62	4071	58	3826	1.331	3	5810	0.064	6	28	0.129	2	165	0	5
33	17-Aug	23.58	2.8	23.75	2.3	22	4093	20	3846	0.465	2	5812	0.042	2	30	0.042	2	167	0	5
33	18-Aug	23.67	2.4	23.50	2.3	18	4111	17	3863	0.382	1	5813	0.021	6	36	0.127	0	167	0	5
34	19-Aug	23.25	2.2	22.83	2.2	59	4170	55	3918	1.280	3	5816	0.069	10	46	0.217	1	168	0	5
34	20-Aug	22.83	2.0	23.00	2.0	65	4235	59	3977	1.418	3	5819	0.069	9	55	0.196	3	171	0	5
34	21-Aug	22.67	1.9	22.42	1.9	48	4283	39	4016	1.068	3	5822	0.067	10	65	0.222	3	174	1	6
34	22-Aug	23.33	1.9	23.75	1.9	20	4303	19	4035	0.429	1	5823	0.021	7	72	0.149	1	175	0	6
34	23-Aug	22.42	1.8	23.25	1.8	32	4335	29	4064	0.701	0	5823	0.000	18	90	0.394	2	177	1	7
34	24-Aug	23.25	1.8	22.92	2.0	10	4345	10	4074	0.217	1	5824	0.022	7	97	0.152	3	180	1	8
34	25-Aug	23.00	2.0	23.42	1.9	17	4362	14	4088	0.366	0	5824	0.000	11	108	0.237	5	185	0	8
35	26-Aug	22.92	1.9	23.17	2.0	16	4378	15	4103	0.347	0	5824	0.000	6	114	0.130	9	194	1	9
35	27-Aug	22.92	2.1	23.33	2.0	13	4391	10	4113	0.281	0	5824	0.000	5	119	0.108	5	199	0	9
35	28-Aug	23.42	2.3	23.33	2.3	9	4400	9	4122	0.193	0	5824	0.000	5	124	0.107	5	204	1	10
35	29-Aug	23.17	2.3	19.75	2.5	6	4406	5	4127	0.140	0	5824	0.000	10	134	0.233	1	205	0	10
35	30-Aug	16.00	2.2	23.50	2.4	5	4411	5	4132	0.127	1	5825	0.025	7	141	0.177	2	207	2	12
35	31-Aug	12.00	2.2	23.00	2.1	7	4418	7	4139	0.200	0	5825	0.000	15	156	0.429	5	212	0	12
35	01-Sep	23.42	2.3	23.58	2.0	2	4420	2	4141	0.043	0	5825	0.000	13	169	0.277	2	214	0	12
36	02-Sep	23.25	2.0	23.33	2.1	5	4425	5	4146	0.107	1	5826	0.021	10	179	0.215	5	219	1	13
36	03-Sep	23.33	2.0	23.33	1.8	6	4431	6	4152	0.129				3	182	0.064	1	220	0	13
36	04-Sep	12.0	2.3	23.58	2.0	2	4433	1	4153	0.056				1	183	0.028	1	221	0	13
36	05-Sep	22.92	2.2	23.50	2.3	3	4436	3	4156	0.065				6	189	0.129	6	227	1	14
36	06-Sep	20.00	2.2	23.33	2.2	2	4438	2	4158	0.046				10	199	0.231	5	232	2	16
36	07-Sep	0.00	0.0	23.58	1.9	0	4438	0	4158	0.000				5	204	0.212	6	238	2	18
36	08-Sep	23.83	2.0	23.83	2.0	1	4439	1	4159	0.021				11	215	0.231	4	242	2	20
37	09-Sep	23.75	2.2	23.75	2.3	2	4441	2	4161	0.042				1	216	0.021	2	244	2	22
37	10-Sep	23.00	2.1	23.00	2.0									2	218	0.043	3	247	0	22
37	11-Sep	23.67	2.2	23.83	2.2									3	221	0.063	1	248	1	23
37	12-Sep	23.33	2.1	23.92	2.3									3	224	0.063	2	250	1	24
37	13-Sep	23.83	2.0	23.92	2.0									5	229	0.109	2	252		
37	14-Sep	23.75	2.3	23.92	2.2									2	231	0.042	3	255		
37	15-Sep	23.75	2.0	21.0	2.0									1	232	0.022	2	257		

Appendix B.1b. Catches and number tagged of salmon in the fish wheels at Canyon Island, 2013.

		FISHING EFFORT				SOCKEYE					PINK			CHUM			DV		Steelhead	
Stat		FWI	FWI	FWII	FWII	FW Catches		FW Tagged		CPUE	Total Catches		CPUE	Total Catches		CPUE	Total Catches		Total Catches	
Week	Date	Effort	RPM	Effort	RPM	Daily	Cum.	Daily	Cum.	Daily	Daily	Cum.	Daily	Daily	Cum.	Daily	Daily	Cum.	Daily	Cum.
20	15-May	22.00	2.3	21.00	2.1															
20	16-May	23.8	2.2	23.50	2.3															
20	17-May	23.58	2.7	23.33	2.5															
20	18-May	23.8	2.6	23.25	2.4															
21	19-May	23.58	2.5	23.25	2.3															
21	20-May	23.67	2.6	23.25	2.3															
21	21-May	22.75	1.8	22.50	1.6															
21	22-May	23.67	1.4	23.25	1.5															
21	23-May	22.50	1.5	22.67	1.5															
21	24-May	23.42	2.2	23.50	2.1															
21	25-May	23.25	2.2	23.58	2.3															
22	26-May	23.25	2.7	23.67	2.7															
22	27-May	23.92	2.8	23.92	2.8															
22	28-May	23.67	3.0	23.92	3.1															
22	29-May	23.92	3.0	23.92	3.1															
22	30-May	23.92	3.1	23.92	3.1															
22	31-May	23.00	3.5	23.08	2.7															
22	01-Jun	23.92	3.1	23.92	2.3															
23	02-Jun	23.75	2.7	23.92	2.0															
23	03-Jun	23.50	2.7	23.33	2.2															
23	04-Jun	23.58	2.7	23.08	2.4	2	2	2	2	0.043										
23	05-Jun	23.25	2.4	23.33	2.0	6	8	6	8	0.129							1	1		
23	06-Jun	23.67	2.2	23.17	2.2	8	16	8	16	0.171							0	1		
23	07-Jun	23.08	2.0	22.50	2.3	7	23	5	21	0.154							0	1		
23	08-Jun	23.58	2.1	23.50	2.2	2	25	2	23	0.042							1	2		
24	09-Jun	23.25	2.5	23.67	2.0	7	32	7	30	0.149							0	2		
24	10-Jun	23.50	2.5	23.42	2.3	12	44	11	41	0.256							1	3		
24	11-Jun	23.25	3.0	23.50	2.7	10	54	10	51	0.214							0	3		
24	12-Jun	18.00	2.8	21.42	2.0	67	121	62	113	1.706							2	5		
24	13-Jun	23.00	2.7	21.92	2.0	59	180	59	172	1.313							0	5		
24	14-Jun	23.25	2.7	21.00	2.1	79	259	78	250	1.785							0	5		
24	15-Jun	23.25	2.6	21.33	1.9	104	363	97	347	2.333							1	6		
25	16-Jun	23.25	2.7	20.83	2.0	105	468	104	451	2.382	1	1	0.023				1	7		
25	17-Jun	22.92	2.5	22.17	2.6	84	552	81	532	1.863	1	2	0.022				0	7		
25	18-Jun	23.50	2.7	22.75	2.0	51	603	51	583	1.103	0	2	0.000				1	8		
25	19-Jun	23.17	2.6	22.75	2.0	65	668	63	646	1.416	2	4	0.044				0	8		
25	20-Jun	23.00	2.5	21.83	2.5	89	757	85	731	1.985	0	4	0.000				0	8		
25	21-Jun	23.25	2.5	23.17	2.2	61	818	59	790	1.314	0	4	0.000				2	10		
25	22-Jun	23.00	2.5	21.83	2.5	136	954	127	917	3.034	0	4	0.000				3	13		
26	23-Jun	23.17	2.5	21.17	2.4	131	1085	127	1044	2.958	0	4	0.000				3	16		
26	24-Jun	23.33	2.4	21.17	2.7	120	1205	117	1161	2.697	0	4	0.000				3	19		
26	25-Jun	23.42	2.6	21.67	2.4	45	1250	44	1205	0.958	0	4	0.000				0	19		
26	26-Jun	23.58	2.5	23.42	2.3	20	1270	20	1225	0.429	0	4	0.000				1	20		
26	27-Jun	23.92	2.6	23.58	2.7	15	1285	15	1240	0.316	0	4	0.000				1	21		
26	28-Jun	23.92	2.8	23.42	2.3	6	1291	6	1246	0.127	0	4	0.000				4	25		
26	29-Jun	23.58	2.4	23.33	1.6	17	1308	17	1263	0.362	1	5	0.021				2	27		
27	30-Jun	23.50	2.7	23.00	2.3	57	1365	57	1320	1.226	1	6	0.022				0	27		
27	01-Jul	23.25	2.3	23.25	2.3	61	1426	59	1379	1.312	14	20	0.301				5	32		
27	02-Jul	23.42	2.4	23.00	2.4	60	1486	59	1438	1.298	17	37	0.366				1	33		
27	03-Jul	23.50	2.5	23.08	2.3	36	1522	36	1474	0.773	26	63	0.558				4	37		
27	04-Jul	23.67	2.7	23.58	2.3	11	1533	11	1485	0.233	10	73	0.212	1	1	0.021	0	37		
27	05-Jul	23.92	3.0	23.92	3.0	0	1533	0	1485	0.000	0	73	0.000	0	1	0.000	0	37		
27	06-Jul	23.83	2.0	20.50	2.0	8	1541	8	1493	0.180	3	76	0.068	0	1	0.000	0	37		
28	07-Jul	22.33	2.3	23.00	1.9	56	1597	54	1547	1.235	142	218	3.133	0	1	0.000	12	49		
28	08-Jul	23.58	2.6	23.58	2.0	13	1610	13	1560	0.276	61	279	1.295	0	1	0.000	0	49		
28	09-Jul	23.58	2.3	23.67	2.2	12	1622	12	1572	0.254	51	330	1.079	0	1	0.000	2	51		
28	10-Jul	23.25	2.1	23.42	2.0	24	1646	24	1596	0.514	213	543	4.564	0	1	0.000	8	59		
28	11-Jul	22.83	2.3	22.42	1.9	74	1720	69	1665	1.635	307	850	6.785	1	2	0.022	9	68		

Appendix B.1b (Cont'd). Catches and number tagged of salmon in the fish wheels at Canyon Island, 2013.

		FISHING EFFORT				SOCKEYE					PINK			CHUM			DV		Steelhead	
Stat		FWI	FWI	FWII	FWII	FW Catches		FW Tagged		CPUE	Total Catches		CPUE	Total Catches		CPUE	Total Catches		Total Catches	
Week	Date	Effort	RPM	Effort	RPM	Daily	Cum.	Daily	Cum.	Daily	Daily	Cum.	Daily	Daily	Cum.	Daily	Daily	Cum.	Daily	Cum.
28	12-Jul	23.00	2.2	22.92	1.9	58	1778	54	1719	1.263	277	1127	6.032	2	4	0.044	4	72		
28	13-Jul	23.00	2.2	23.00	2.0	73	1851	72	1791	1.587	265	1392	5.761	0	4	0.000	6	78		
29	14-Jul	23.33	2.5	22.92	2.1	59	1910	54	1845	1.276	202	1594	4.368	0	4	0.000	3	81		
29	15-Jul	22.50	2.4	22.67	2.0	91	2001	87	1932	2.015	310	1904	6.863	0	4	0.000	4	85		
29	16-Jul	21.92	2.1	21.59	1.8	148	2149	142	2074	3.402	497	2401	11.423	0	4	0.000	8	93		
29	17-Jul	22.50	2.3	22.25	2.2	112	2261	107	2181	2.503	433	2834	9.676	0	4	0.000	5	98		
29	18-Jul	22.25	2.6	22.50	2.4	100	2361	95	2276	2.235	326	3160	7.285	0	4	0.000	0	98		
29	19-Jul	23.17	2.2	22.50	2.3	93	2454	90	2366	2.036	204	3364	4.467	0	4	0.000	2	100		
29	20-Jul	23.08	2.3	23.08	2.4	78	2532	77	2443	1.690	121	3485	2.621	0	4	0.000	2	102		
30	21-Jul	23.83	2.0	23.00	2.4	114	2646	113	2556	2.434	96	3581	2.050	0	4	0.000	2	104		
30	22-Jul	23.50	2.1	22.92	2.3	85	2731	83	2639	1.831	68	3649	1.465	0	4	0.000	4	108		
30	23-Jul	23.17	1.9	22.87	2.1	127	2858	122	2761	2.758	119	3768	2.585	0	4	0.000	4	112		
30	24-Jul	23.42	2.2	23.17	2.1	53	2911	49	2810	1.138	96	3864	2.061	0	4	0.000	1	113		
30	25-Jul	23.42	2.4	23.17	2.0	56	2967	50	2860	1.202	102	3966	2.189	1	5	0.021	0	113		
30	26-Jul	23.17	2.3	23.58	2.0	29	2996	27	2887	0.620	69	4035	1.476	0	5	0.000	2	115		
30	27-Jul	23.42	2.5	23.25	2.2	61	3057	57	2944	1.307	109	4144	2.336	0	5	0.000	0	115		
31	28-Jul	22.75	2.6	22.42	2.1	135	3192	133	3077	2.989	113	4257	2.502	0	5	0.000	4	119		
31	29-Jul	22.92	2.8	23.17	2.5	99	3291	96	3173	2.148	73	4330	1.584	0	5	0.000	0	119		
31	30-Jul	23.08	2.1	22.42	2.4	104	3395	98	3271	2.286	50	4380	1.099	0	5	0.000	0	119		
31	31-Jul	23.33	2.4	23.25	2.6	66	3461	60	3331	1.417	35	4415	0.751	0	5	0.000	2	121		
31	01-Aug	23.08	2.4	23.17	2.5	62	3523	54	3385	1.341	55	4470	1.189	0	5	0.000	0	121		
31	02-Aug	23.42	2.0	23.17	2.4	41	3564	34	3419	0.880	43	4513	0.923	0	5	0.000	4	125		
31	03-Aug	23.17	2.5	22.92	2.5	51	3615	47	3466	1.107	33	4546	0.716	3	8	0.065	0	125		
32	04-Aug	23.58	2.1	23.42	2.3	32	3647	29	3495	0.681	9	4555	0.191	0	8	0.000	0	125		
32	05-Aug	23.59	2.2	23.41	2.1	30	3677	26	3521	0.638	21	4576	0.447	0	8	0.000	0	125		
32	06-Aug	23.50	2.1	23.42	2.3	34	3711	31	3552	0.725	9	4585	0.192	1	9	0.021	1	126		
32	07-Aug	23.08	2.4	23.25	2.0	34	3745	32	3584	0.734	11	4596	0.237	0	9	0.000	4	130		
32	08-Aug	23.25	2.7	23.08	2.3	39	3784	38	3622	0.842	11	4607	0.237	0	9	0.000	2	132		
32	09-Aug	23.42	2.6	23.33	2.1	24	3808	21	3643	0.513	5	4612	0.107	2	11	0.043	2	134		
32	10-Aug	23.17	2.4	23.00	2.1	40	3848	37	3680	0.866	7	4619	0.152	3	14	0.065	0	134		
33	11-Aug	23.42	2.3	22.50	2.1	31	3879	27	3707	0.675	4	4623	0.087	3	17	0.065	4	138	1	1
33	12-Aug	23.33	2.7	23.00	2.3	44	3923	40	3747	0.950	7	4630	0.151	3	20	0.065	3	141	0	1
33	13-Aug	23.41	2.7	23.08	1.7	31	3954	27	3774	0.667	5	4635	0.108	0	20	0.000	0	141	0	1
33	14-Aug	23.42	2.1	23.25	2.3	40	3994	36	3810	0.857	2	4637	0.043	1	21	0.021	1	142	0	1
33	15-Aug	23.33	2.2	22.75	2.2	21	4015	20	3830	0.456	5	4642	0.109	3	24	0.065	2	144	0	1
33	16-Aug	23.66	2.3	23.50	2.2	7	4022	5	3835	0.148	0	4642	0.000	1	25	0.021	1	145	0	1
33	17-Aug	23.66	1.8	23.00	1.9	7	4029	7	3842	0.150	2	4644	0.043	1	26	0.021	2	147	0	1
34	18-Aug	23.50	2.4	23.33	2.1	7	4036	4	3846	0.149	2	4646	0.043	6	32	0.128	1	148	0	1
34	19-Aug	22.50	1.7	23.50	1.8	21	4057	20	3866	0.457	5	4651	0.109	6	38	0.130	2	150	0	1
34	20-Aug	23.16	0.6	23.66	1.8	13	4070	13	3879	0.278	0	4651	0.000	3	41	0.064	1	151	1	2
34	21-Aug	22.83	2.1	23.67	1.7	21	4091	12	3891	0.452	2	4653	0.043	2	43	0.043	1	152	0	2
34	22-Aug	23.33	1.9	23.67	0.9	6	4097	4	3895	0.128	2	4655	0.043	6	49	0.128	5	157	2	4
34	23-Aug	23.33	1.8	23.83	1.3	6	4103	5	3900	0.127	1	4656	0.021	1	50	0.021	1	158	0	4
34	24-Aug	23.33	2.0	23.75	1.7	10	4113	8	3908	0.212	0	4656	0.000	3	53	0.064	3	161	0	4
35	25-Aug	23.50	1.5	23.58	1.7	7	4120	5	3913	0.149	2	4658	0.042	4	57	0.085	3	164	0	4
35	26-Aug	22.75	2.0	23.33	2.0	17	4137	16	3929	0.369	1	4659	0.022	8	65	0.174	3	167	0	4
35	27-Aug	23.25	2.0	23.50	2.1	19	4156	15	3944	0.406	1	4660	0.021	5	70	0.107	4	171	1	5
35	28-Aug	22.50	2.3	12.33	2.3	12	4168	10	3954	0.345	1	4661	0.029	8	78	0.230	3	174	0	5
35	29-Aug	23.12	2.1	23.58	2.2	14	4182	8	3962	0.300	3	4664	0.064	20	98	0.428	0	174	0	5
35	30-Aug	23.08	2.0	23.33	2.1	8	4190	5	3967	0.172	2	4666	0.043	33	131	0.711	3	177	1	6
35	31-Aug	23.08	2.1	23.25	2.0	8	4198	6	3973	0.173	0	4666	0.000	19	150	0.410	1	178	1	7
36	01-Sep	23.17	2.0	23.17	2.0	15	4213	12	3985	0.324	0	4666	0.000	14	164	0.302	4	182	1	8
36	02-Sep	23.50	2.1	23.58	2.3	2	4215	1	3986	0.042	0	4666	0.000	14	178	0.297	4	186	0	8
36	03-Sep	23.50	2.1	23.42	2.0	5	4220	5	3991	0.107	0	4666	0.000	8	186	0.171	1	187	1	9
36	04-Sep	23.1	2.4	23.75	2.0	9	4229	9	4000	0.192	0	4666	0.000	18	204	0.384	0	187	1	10
36	05-Sep	23.50	2.6	23.67	2.3	0	4229	0	4000	0.000	0	4666	0.000	8	212	0.170	0	187	0	10
36	06-Sep	23.25	2.6	23.08	2.0	4	4233	4	4004	0.086	0	4666	0.000	18	230	0.389	0	187	0	10
36	07-Sep	23.17	2.9	23.08	2.3	3	4236	3	4007	0.065	0	4666	0.000	26	256	0.562	0	187	0	10
37	08-Sep	23.59	2.9	23.67	2.5	0	4236	0	4007	0.000	0	4666	0.000	4	260	0.085	1	188	1	11
37	09-Sep	23.34	2.5	23.50	2.0	4	4240	4	4011	0.085	0	4666	0.000	9	269	0.192	0	188	0	11

Appendix C.1a. Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class											
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 22 (May 27 - June 2)												
Male												
Sample Size								3				3
Percent								60.0				60.0
Std. Error								24.5				24.5
Female												
Sample Size								1			1	2
Percent								20.0			20.0	40.0
Std. Error								20.0			20.0	24.5
All Fish												
Sample Size								4			1	5
Percent								80.0			20.0	100.0
Std. Error								20.0			20.0	
Statistical Week 23 (June 3 - 9)												
Male												
Sample Size								2				2
Percent								66.7				66.7
Std. Error								33.3				33.3
Female												
Sample Size											1	1
Percent											33.3	33.3
Std. Error											33.3	33.3
All Fish												
Sample Size								2			1	3
Percent								66.7			33.3	100.0
Std. Error								33.3			33.3	

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class											
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 24 (June 10 - June 16)												
Male												
Sample Size				1	3			16			1	21
Percent				1.8	5.3			28.1			1.8	36.8
Std. Error				1.8	3.0			6.0			1.8	6.4
Female												
Sample Size					2			27	1		6	36
Percent					3.5			47.4	1.8		10.5	63.2
Std. Error					2.5			6.7	1.8		4.1	6.4
All Fish												
Sample Size				1	5			43	1		7	57
Percent				1.8	8.8			75.4	1.8		12.3	100.0
Std. Error				1.8	3.8			5.8	1.8		4.4	
Statistical Week 25 (June 17 - June 23)												
Male												
Sample Size				1	3			7				11
Percent				2.3	6.8			15.9				25.0
Std. Error				2.3	3.8			5.6				6.6
Female												
Sample Size					17			11	2		3	33
Percent					38.6			25.0	4.5		6.8	75.0
Std. Error					7.4			6.6	3.2		3.8	6.6
All Fish												
Sample Size				1	20			18	2		3	44
Percent				2.3	45.5			40.9	4.5		6.8	100.0
Std. Error				2.3	7.6			7.5	3.2		3.8	

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class											
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 26 (June 24 - June 30)												
Male												
Sample Size		1		1	29		1	15	1		2	50
Percent		0.7		0.7	21.6		0.7	11.2	0.7		1.5	37.3
Std. Error		0.7		0.7	3.6		0.7	2.7	0.7		1.1	4.2
Female												
Sample Size				1	49			27	5		2	84
Percent				0.7	36.6			20.1	3.7		1.5	62.7
Std. Error				0.7	4.2			3.5	1.6		1.1	4.2
All Fish												
Sample Size		1		2	78		1	42	6		4	134
Percent		0.7		1.5	58.2		0.7	31.3	4.5		3.0	100.0
Std. Error		0.7		1.1	4.3		0.7	4.0	1.8		1.5	
Statistical Week 27 (July 1 - July 7)												
Male												
Sample Size		7		2	53			20	4	1	1	88
Percent		4.3		1.2	32.5			12.3	2.5	0.6	0.6	54.0
Std. Error		1.6		0.9	3.7			2.6	1.2	0.6	0.6	3.9
Female												
Sample Size				4	44			21	3	1	2	75
Percent				2.5	27.0			12.9	1.8	0.6	1.2	46.0
Std. Error				1.2	3.5			2.6	1.1	0.6	0.9	3.9
All Fish												
Sample Size		7		6	97			41	7	2	3	163
Percent		4.3		3.7	59.5			25.2	4.3	1.2	1.8	100.0
Std. Error		1.6		1.5	3.9			3.4	1.6	0.9	1.1	

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class											
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.2	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 28 (July 8 - July 14)												
Male												
Sample Size		14	1	6	57			8	4			90
Percent		8.0	0.6	3.4	32.8			4.6	2.3			51.7
Std. Error		2.1	0.6	1.4	3.6			1.6	1.1			3.8
Female												
Sample Size				12	35			27	10			84
Percent				6.9	20.1			15.5	5.7			48.3
Std. Error				1.2	3.0			2.9	1.8			3.8
All Fish												
Sample Size		14	1	18	92			35	14			174
Percent		8.0	0.6	10.3	52.9			20.1	8.0			100.0
Std. Error		2.1	0.6	2.3	3.8			3.0	2.1			
Statistical Week 29 (July 15 - July 21)												
Male												
Sample Size		17		12	66			7	10		2	114
Percent		8.9		6.3	34.7			3.7	5.3		1.1	60.0
Std. Error		2.1		1.8	3.5			1.4	1.6		0.7	3.6
Female												
Sample Size		1		13	28			23	9	2		76
Percent		0.5		6.8	14.7			12.1	4.7	1.1		40.0
Std. Error		0.5		1.8	2.6			2.4	1.5	0.7		3.6
All Fish												
Sample Size		18		25	94			30	19	2	2	190
Percent		9.5		13.2	49.5			15.8	10.0	1.1	1.1	100.0
Std. Error		2.1		2.5	3.6			2.7	2.2	0.7	0.7	

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class										
	2010	2009	2008	2006	2005	2004	2003	2007	2007	2006	2006	
	5.1	5.2	5.1	6.2	6.2	6.1	6.2	1.3	2.2	1.2	2.3	Total
Statistical Week 30 (July 22 - July 28)												
Male												
Sample Size		12	1	8	43	1		12	3	1		83
Percent		8.8	1.5	6.0	78.1	0.8		8.8	2.3	0.8		67.2
Std. Error		1.9	1.5	1.5	3.2	0.8		1.9	1.3	0.8		3.9
Female												
Sample Size		2		12	24			14	1			53
Percent		1.1		9.7	18.8			13.3	1.0			32.8
Std. Error		0.8		2.2	3.0			3.0	1.0			3.9
All Fish												
Sample Size		14	1	25	74	1		46	13	1		136
Percent		8.0	0.6	14.7	43.3	0.6		26.1	4.9	0.6		100.0
Std. Error		2.0	0.6	2.6	3.7	0.6		3.3	1.9	0.6		
Statistical Week 31 (July 29 - August 4)												
Male												
Sample Size	1	3		5	29	1		8	2			49
Percent	0.8	3.1		4.2	24.0	0.8		9.0	1.7			43.1
Std. Error	0.8	1.6		1.8	3.9	0.8		2.6	1.2			4.5
Female												
Sample Size				19	31			20	4		1	75
Percent				12.4	21.4			14.8	3.0		0.8	52.3
Std. Error				3.0	3.8			3.4	1.5		0.8	4.3
All Fish												
Sample Size	1	3		24	60	1		28	6		1	124
Percent	0.8	3.1		16.7	41.3	0.8		23.8	4.6		0.8	100.0
Std. Error	0.8	1.6		3.4	4.3	0.8		4.2	1.8		0.8	

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class										
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 32 (August 5 - August 11)												
Male												
Sample Size	1	4	3	3	27			4	9			51
Percent	0.7	3.0	2.2	2.2	20.1			3.0	6.7			38.1
Std. Error	0.7	1.5	1.3	1.3	3.5			1.5	2.2			4.2
Female												
Sample Size				11	43			16	13			83
Percent				8.2	32.1			11.9	9.7			61.9
Std. Error				2.4	4.0			2.8	2.6			4.2
All Fish												
Sample Size	1	4	3	14	70			20	22			134
Percent	0.7	3.0	2.2	10.4	52.2			14.9	16.4			100.0
Std. Error	0.7	1.5	1.3	2.7	4.3			3.1	3.2			
Statistical Week 33 (August 12 - August 18)												
Male												
Sample Size		2	3	5	34			2	7	1		54
Percent		1.3	1.9	3.2	22.1			1.3	4.5	0.6		35.1
Std. Error		0.9	1.1	1.4	3.4			0.9	1.7	0.6		3.9
Female												
Sample Size				12	51			21	15	1		100
Percent				7.8	33.1			13.6	9.7	0.6		64.9
Std. Error				2.7	3.8			2.8	2.4	0.6		3.9
All Fish												
Sample Size		2	3	17	85			23	22	2		154
Percent		1.3	1.9	11.0	55.2			14.9	14.3	1.3		100.0
Std. Error		0.9	1.1	2.5	4.0			2.9	2.8	0.9		

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class										
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.1	0.2	1.1	0.2	1.2	2.2	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 34 (August 19 - August 25)												
Male												
Sample Size	3	3	7	2	16			1	7		1	40
Percent	2.4	2.4	5.6	1.6	12.9			0.8	5.6		0.8	32.3
Std. Error	1.4	1.4	2.1	1.1	3.0			0.8	2.1		0.8	4.2
Female												
Sample Size				1	44			13	20			84
Percent				0.8	35.5			10.5	16.1			67.7
Std. Error				0.8	4.3			2.8	3.3			4.2
All Fish												
Sample Size	3	3	7	3	60			14	27		1	124
Percent	2.4	2.4	5.6	2.4	48.4			11.3	21.8		0.8	100.0
Std. Error	1.4	1.4	2.1	1.4	4.5			2.9	3.7		0.8	
Statistical Week 35 (August 26 - September 1)												
Male												
Sample Size			4	1	3				2			10
Percent			12.1	3.0	9.1				6.1			30.3
Std. Error			5.8	3.0	5.1				4.2			8.1
Female												
Sample Size				3	9			3	8			23
Percent				9.1	27.3			15.2	18.2			69.7
Std. Error				5.1	7.9			6.2	6.8			8.1
All Fish												
Sample Size			4	4	12			3	8			33
Percent			12.1	12.1	36.4			15.2	24.2			100.0
Std. Error			5.8	5.8	8.5			6.2	7.6			

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class											
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 36 (September 2 - September 8)												
Male												
Sample Size					1			1				2
Percent					8.3			8.3				16.7
Std. Error					8.3			8.3				11.2
Female												
Sample Size				1	6			3				10
Percent				8.3	50.0			25.0				83.3
Std. Error				8.3	15.1			13.1				11.2
All Fish												
Sample Size				1	7			4				12
Percent				8.3	58.3			33.3				100.0
Std. Error				8.3	14.9			14.2				
Statistical Week 37 (September 9 - September 15)												
Male												
Sample Size												0
Percent												0.0
Std. Error												
Female												
Sample Size								1				1
Percent								100.0				100.0
Std. Error								-				-
All Fish												
Sample Size								1				1
Percent								100.0				100.0
Std. Error								-				

Appendix C.1a (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class											
	2010	2009	2009	2008	2008	2008	2007	2007	2007	2006	2006	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Combined Periods (May 27 - September 15)												
Male												
Sample Size	5	64	19	47	364	2	1	104	51	2	8	667
Percent	0.3	4.2	1.2	3.1	23.9	0.1	0.1	6.8	3.3	0.1	0.5	43.7
Std. Error	0.1	0.5	0.3	0.4	1.1	0.1	0.1	0.6	0.5	0.1	0.2	1.3
Female												
Sample Size	0	3	0	96	382	0	0	260	97	3	17	858
Percent	0.0	0.2	0.0	6.3	25.0	0.0	0.0	17.0	6.4	0.2	1.1	56.3
Std. Error	0.0	0.1	0.0	0.6	1.1	0.0	0.0	1.0	0.6	0.1	0.3	1.3
All Fish												
Sample Size	5	67	19	143	746	2	1	364	148	5	25	1525
Percent	0.3	4.4	1.2	9.4	48.9	0.1	0.1	23.9	9.7	0.3	1.6	100.0
Std. Error	0.1	0.5	0.3	0.7	1.3	0.1	0.1	1.1	0.8	0.1	0.3	

Appendix C.1b. Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class										
	2011	2010	2010	2009	2009	2009	2008	2008	2008	2007	2007	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 23 (June 2 - 8)												
Male												
Sample Size				1	1			6				8
Percent				6.3	6.3			37.5				50.0
Std. Error				6.3	6.3			12.5				12.9
Female												
Sample Size								7			1	8
Percent								43.8			6.3	50.0
Std. Error								12.8			6.3	12.9
All Fish												
Sample Size				1	1			13			1	16
Percent				6.3	6.3			81.3			6.3	100.0
Std. Error				6.3	6.3			10.1			6.3	
Statistical Week 24 (June 9 - June 15)												
Male												
Sample Size		1		5	12		1	64			3	86
Percent		0.5		2.3	5.6		0.5	30.0			1.4	40.4
Std. Error		0.5		1.0	1.6		0.5	3.1			0.8	3.4
Female												
Sample Size			1		28			97		1		127
Percent			0.5		13.1			45.5		0.5		59.6
Std. Error			0.5		2.3			3.4		0.5		3.4
All Fish												
Sample Size		1	1	5	40		1	161		1	3	213
Percent		0.5	0.5	2.3	18.8		0.5	75.6		0.5	1.4	100.0
Std. Error		0.5	0.5	1.0	2.7		0.5	3.0		0.5	0.8	

Appendix C.1b (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class											
	2011	2010	2010	2009	2009	2009	2008	2008	2008	2007	2007	
	0.1	0.2	1.1	1.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 25 (June 16 - June 22)												
Male												
Sample Size				3	35			60	1		4	103
Percent				1.5	17.0			29.1	0.5		1.9	50.0
Std. Error				0.8	2.6			3.2	0.5		1.0	3.5
Female												
Sample Size				2	46			49			6	103
Percent				1.0	22.3			23.8			2.9	50.0
Std. Error				0.7	2.9			3.0			1.2	3.5
All Fish												
Sample Size				5	81			109	1		10	206
Percent				2.4	39.3			52.9	0.5		4.9	100.0
Std. Error				1.1	3.4			3.5	0.5		1.5	
Statistical Week 26 (June 23 - June 29)												
Male												
Sample Size		1		1	49			17			3	89
Percent		0.8		0.8	21.7			15.6			0.8	46.0
Std. Error		0.8		0.8	4.2			3.1			0.8	4.8
Female												
Sample Size				1	42			17	2		2	64
Percent				0.8	34.1			13.8	1.6		1.6	52.0
Std. Error				0.8	4.3			3.1	1.1		1.1	4.8
All Fish												
Sample Size		1		2	91			34	2		5	153
Percent		0.8		1.6	55.9			27.6	1.6		2.4	100.0
Std. Error		0.8		1.1	4.3			4.0	1.1		1.4	

Appendix C.1b (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class										
	2011	2010	2009	2008	2007	2006	2005	1998	1997	1996	
	0.1	0.2	1.1	0.3	1.2	1.1	0.3	1.2	0.2	1.3	Total
Statistical Week 27 (June 30 - July 6)											
Male											
Sample Size	2	1	5	10			0	2		1	19
Percent	2.6	1.6	6.0	12.1			1.1	1.6			25.6
Std. Error	1.1	0.9	1.6	4.0			1.1	1.1			4.5
Female											
Sample Size			3	40			16	2		2	63
Percent			3.6	48.4			17.0	2.1		1.5	72.4
Std. Error			0.8	4.3			4.0	1.5		1.1	4.7
All Fish											
Sample Size	2	1	8	50			16	4		3	174
Percent	1.5	0.8	4.6	60.5			17.1	3.6		1.5	100.0
Std. Error	1.1	0.8	1.5	4.1			4.0	1.6		1.1	
Statistical Week 28 (July 7 - July 13)											
Male											
Sample Size	15	5	31	44	2		27	3		4	99
Percent	9.0	3.0	1.2	21.0	1.0		11.0	1.0		3.0	34.1
Std. Error	2.1	1.4	2.1	3.1	1.0		3.1	1.1		1.1	4.3
Female											
Sample Size			7	71			28	2	1	1	84
Percent			1.0	12.1			15.0	0.7	0.7	0.7	65.9
Std. Error			1.7	3.0			3.0	0.7	0.7	0.7	4.3
All Fish											
Sample Size	15	5	38	115	2		55	5	1	5	183
Percent	9.0	3.1	13.0	33.3	1.0		31.7	1.0	0.7	3.0	100.0
Std. Error	2.0	1.3	2.0	3.3	1.0		3.0	1.0	0.7	1.0	

Appendix C.1b (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class										
	2011	2010	2010	2009	2009	2009	2008	2008	2008	2007	2007	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 29 (July 14 - July 20)												
Male												
Sample Size	1	11	3	9	25		1	48	1		6	85
Percent	0.5	5.2	1.4	4.3	12.1		0.5	18.4	0.5		2.9	45.9
Std. Error	0.5	1.6	0.8	1.4	2.3		0.5	2.7	0.5		1.2	3.5
Female												
Sample Size				16	1			89	1		2	112
Percent				7.7	0.4			41.2	0.5		0.9	54.1
Std. Error				1.9	1.1			3.4	0.5		1.1	3.5
All Fish												
Sample Size	1	11	3	25	26		1	137	2		11	197
Percent	0.5	5.3	1.4	12.1	14.5		0.5	59.4	1.0		5.3	100.0
Std. Error	0.5	1.6	0.8	2.3	2.5		0.5	3.4	0.7		1.6	
Statistical Week 30 (July 21 - July 27)												
Male												
Sample Size	3	9	4	3	16			53		1	5	90
Percent	1.6	4.7	1.6	1.6	8.4			28.7		0.5	2.6	47.1
Std. Error	0.9	1.5	0.9	0.9	2.0			3.2		0.5	1.2	3.6
Female												
Sample Size				16	2		1	74		2	7	101
Percent				8.4	1.0		0.5	38.7		0.5	3.7	52.9
Std. Error				2.0	0.7		0.5	3.5		0.5	1.4	3.6
All Fish												
Sample Size	3	9	4	19	18		1	126		3	12	191
Percent	1.6	4.7	1.6	9.9	9.4		0.5	65.4		1.0	6.3	100.0
Std. Error	0.9	1.5	0.9	2.2	2.1		0.5	3.4		0.7	1.8	

Appendix C.1b (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class										
	2011	2010	2010	2009	2009	2009	2008	2008	2008	2007	2007	
	0.3	0.2	1.3	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 31 (July 28 - August 3)												
Male												
Sample Size	5	15	19	4	19	2		65	2		11	136
Percent	2.4	6.9	8.7	1.8	8.9	0.9		29.7	0.9		5.0	62.1
Std. Error	1.0	1.7	1.9	0.9	1.6	0.6		3.1	0.6		1.5	3.3
Female												
Sample Size				8	8			64	2	1	2	83
Percent				3.7	3.7			29.2	0.9	0.5	0.9	37.9
Std. Error				1.3	1.3			3.1	0.6	0.5	0.6	3.3
All Fish												
Sample Size	5	15	19	12	19	2		129	4	1	13	219
Percent	2.4	6.8	8.7	5.5	8.7	0.9		58.9	1.8	0.5	5.9	100.0
Std. Error	1.0	1.7	1.9	1.5	1.9	0.6		3.3	0.9	0.5	1.6	
Statistical Week 32 (August 4 - August 10)												
Male												
Sample Size	5	10	24	4	15			35			4	97
Percent	4.0	8.1	14.5	2.4	9.1			15.2			2.4	52.7
Std. Error	1.8	2.5	2.8	1.2	2.2			2.8			1.2	3.9
Female												
Sample Size				7	5			54	1	1	12	78
Percent				4.2	1.8			17.7	0.6	0.6	3.3	47.3
Std. Error				1.6	1.0			3.7	0.6	0.6	2.0	3.9
All Fish												
Sample Size	5	10	24	11	18			79	1	1	16	165
Percent	3.0	8.1	14.8	6.7	10.9			47.9	0.6	0.6	9.7	100.0
Std. Error	1.3	1.9	2.8	1.9	2.4			3.9	0.6	0.6	2.3	

Appendix C.1b (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class											
	2011	2010	2010	2009	2009	2009	2008	2008	2008	2007	2007	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 33 (August 11 - August 17)												
Male												
Sample Size	3	2	12	2	7	1		26			3	56
Percent	2.4	1.6	9.4	1.6	5.5	0.8		20.5			2.4	44.1
Std. Error	1.4	1.1	2.6	1.1	2.0	0.8		3.6			1.4	4.4
Female												
Sample Size				3	5			50	3	1	9	71
Percent				2.4	3.9			39.4	2.4	0.8	7.1	55.9
Std. Error				1.4	1.7			4.4	1.4	0.8	2.3	4.4
All Fish												
Sample Size	3	2	12	5	12	1		76	3	1	12	127
Percent	2.4	1.6	9.4	3.9	9.4	0.8		59.8	2.4	0.8	9.4	100.0
Std. Error	1.4	1.1	2.6	1.7	2.6	0.8		4.4	1.4	0.8	2.6	
Statistical Week 34 (August 18 - August 24)												
Male												
Sample Size	5	1	10		5			18	1		3	43
Percent	6.0	1.2	11.9		6.0			21.4	1.2		3.6	51.2
Std. Error	2.6	1.2	3.6		2.6			4.5	1.2		2.0	5.5
Female												
Sample Size				3	1			27	3		7	41
Percent				3.6	1.2			32.1	3.6		8.3	48.8
Std. Error				2.0	1.2			5.1	2.0		3.0	5.5
All Fish												
Sample Size	5	1	10	3	6			45	4		10	84
Percent	6.0	1.2	11.9	3.6	7.1			53.6	4.8		11.9	100.0
Std. Error	2.6	1.2	3.6	2.0	2.8			5.5	2.3		3.6	

Appendix C.1b (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class											
	2011	2010	2010	2009	2009	2009	2008	2008	2008	2007	2007	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 35 (August 25 - August 31)												
Male												
Sample Size	3	3	18	1	3		1	21	1		6	57
Percent	2.5	2.5	15.0	0.8	2.5		0.8	17.5	0.8		5.0	47.5
Std. Error	1.4	1.4	3.3	0.8	1.4		0.8	3.5	0.8		2.0	4.6
Female												
Sample Size				2	2			49	2		8	63
Percent				1.7	1.7			40.8	1.7		6.7	52.5
Std. Error				1.2	1.2			4.5	1.2		2.3	4.6
All Fish												
Sample Size	3	3	18	3	5		1	70	3		14	120
Percent	2.5	2.5	15.0	2.5	4.2		0.8	58.3	2.5		11.7	100.0
Std. Error	1.4	1.4	3.3	1.4	1.8		0.8	4.5	1.4		2.9	
Statistical Week 36 (September 1 - September 7)												
Male												
Sample Size			5		1			2				8
Percent			23.8		4.8			9.5				38.1
Std. Error			9.5		4.8			6.6				10.9
Female												
Sample Size				1	1			11				13
Percent				4.8	4.8			52.4				61.9
Std. Error				4.8	4.8			11.2				10.9
All Fish												
Sample Size			5	1	2			13				21
Percent			23.8	4.8	9.5			61.9				100.0
Std. Error			9.5	4.8	6.6			10.9				

Appendix C.1b (Cont'd). Age composition of sockeye salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class											
	2011	2010	2010	2009	2009	2009	2008	2008	2008	2007	2007	
	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	1.4	2.3	Total
Statistical Week 37 (September 8 - September 14)												
Male												
Sample Size								1				1
Percent								33.3				33.3
Std. Error								33.3				33.3
Female												
Sample Size								2				2
Percent								66.7				66.7
Std. Error								33.3				33.3
All Fish												
Sample Size								3				3
Percent								100.0				100.0
Std. Error								-				
Combined Periods (June 2 - September 14)												
Male												
Sample Size	25	69	100	49	245	5	3	430	11	1	49	987
Percent	1.3	3.5	5.1	2.5	12.4	0.3	0.2	21.8	0.6	0.1	2.5	50.1
Std. Error	0.3	0.4	0.5	0.4	0.7	0.1	0.1	0.9	0.2	0.1	0.4	1.1
Female												
Sample Size	0	0	1	67	207	0	1	625	16	6	62	985
Percent	0.0	0.0	0.1	3.4	10.5	0.0	0.1	31.7	0.8	0.3	3.1	49.9
Std. Error	0.0	0.0	0.1	0.4	0.7	0.0	0.1	1.0	0.2	0.1	0.4	1.1
All Fish												
Sample Size	25	69	101	116	452	5	4	1055	27	7	111	1972
Percent	1.3	3.5	5.1	5.9	22.9	0.3	0.2	53.5	1.4	0.4	5.6	100.0
Std. Error	0.3	0.4	0.5	0.5	0.9	0.1	0.1	1.1	0.3	0.1	0.5	

Appendix C.2a. Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 27 (July 1 - July 7)					
Male					
Sample Size		1			1
Percent		100.0			100.0
Std. Error		-			-
Female					
Sample Size					
Percent					
Std. Error					
All Fish					
Sample Size		1			1
Percent		100.0			100.0
Std. Error		-			-
Statistical Week 28 (July 8 - July 14)					
Male					
Sample Size				1	1
Percent				100.0	100.0
Std. Error				-	-
Female					
Sample Size					
Percent					
Std. Error					
All Fish					
Sample Size				1	1
Percent				100.0	100.0
Std. Error				-	-

Appendix C.2a (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 29 (July 15 - July 21)					
Male					
Sample Size			1		1
Percent			50.0		50.0
Std. Error			50.0		-
Female					
Sample Size		1			1
Percent		50.0			50.0
Std. Error		50.0			-
All Fish					
Sample Size		1	1		2
Percent		50.0	50.0		100.0
Std. Error		50.0	50.0		-
Statistical Week 30 (July 22 - July 28)					
Male					
Sample Size					
Percent					
Std. Error					
Female					
Sample Size		3			3
Percent		100.0			100.0
Std. Error		0.0			-
All Fish					
Sample Size		3			3
Percent		100.0			100.0
Std. Error		0.0			-

Appendix C.2a (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 31 (July 29 - August 4)					
Male					
Sample Size					0
Percent					0.0
Std. Error					
Female					
Sample Size					0
Percent					0.0
Std. Error					
All Fish					
Sample Size					0
Percent					0.0
Std. Error					
Statistical Week 32 (August 5 - August 11)					
Male					
Sample Size		2			2
Percent		50.0			50.0
Std. Error		28.9			28.9
Female					
Sample Size		2			2
Percent		50.0			50.0
Std. Error		28.9			28.9
All Fish					
Sample Size		4			4
Percent		100.0			100.0
Std. Error		0.0			

Appendix C.2a (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 33 (August 12 - August 18)					
Male					
Sample Size		5	6		11
Percent		23.8	28.6		52.4
Std. Error		9.5	10.1		11.2
Female					
Sample Size		6	4		10
Percent		28.6	19.0		47.6
Std. Error		10.1	8.8		11.2
All Fish					
Sample Size		11	10		21
Percent		52.4	47.6		100.0
Std. Error		11.2	11.2		
Statistical Week 34 (August 19 - August 25)					
Male					
Sample Size		12	15		27
Percent		19.0	23.8		42.9
Std. Error		5.0	5.4		6.3
Female					
Sample Size		18	18		36
Percent		28.6	28.6		57.1
Std. Error		5.7	5.7		6.3
All Fish					
Sample Size		30	33		63
Percent		47.6	52.4		100.0
Std. Error		6.3	6.3		

Appendix C.2a (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 35 (August 26 - September 1)					
Male					
Sample Size		9	15		24
Percent		15.5	25.9		41.4
Std. Error		4.8	5.8		6.5
Female					
Sample Size	1	15	18		34
Percent	1.7	25.9	31.0		58.6
Std. Error	1.7	5.8	6.1		6.5
All Fish					
Sample Size	1	24	33		58
Percent	1.7	41.4	56.9		100.0
Std. Error	1.7	6.5	6.6		
Statistical Week 36 (September 2 - September 8)					
Male					
Sample Size		3	9		12
Percent		8.8	26.5		35.3
Std. Error		4.9	7.7		8.3
Female					
Sample Size		8	14		22
Percent		23.5	41.2		64.7
Std. Error		7.4	8.6		8.3
All Fish					
Sample Size		11	23		34
Percent		32.4	67.6		100.0
Std. Error		8.1	8.1		

Appendix C.2a (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2012.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 37 (September 8 - September 14)					
Male					
Sample Size		2	5		7
Percent		12.5	31.3		43.8
Std. Error		8.5	12.0		12.8
Female					
Sample Size		7	2		9
Percent		43.8	12.5		56.3
Std. Error		12.8	8.5		12.8
All Fish					
Sample Size		9	7		16
Percent		56.3	43.8		100.0
Std. Error		12.8	12.8		
Combined Periods (July 1 - September 14)					
Male					
Sample Size		34	51	1	86
Percent		16.7	25.1	0.5	42.4
Std. Error		2.6	3.1	0.5	3.5
Female					
Sample Size	1	60	56		117
Percent	0.5	29.6	27.6		57.6
Std. Error	0.5	3.2	3.1		3.5
All Fish					
Sample Size	1	94	107	1	203
Percent	0.5	46.3	52.7	0.5	100.0
Std. Error	0.5	3.5	3.5	0.5	

Appendix C.2b. Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class				
	2010	2009	2008	2007	
	0.2	0.3	0.4	0.5	Total
Statistical Week 27 (June 30 - July 6)					
Male					
Sample Size			1		1
Percent			100.0		100.0
Std. Error					-
Female					
Sample Size					
Percent					
Std. Error					
All Fish					
Sample Size			1		1
Percent			100.0		100.0
Std. Error					-
Statistical Week 28 (July 7 - July 13)					
Male					
Sample Size			2		2
Percent			100.0		100.0
Std. Error					-
Female					
Sample Size					
Percent					
Std. Error					
All Fish					
Sample Size					2
Percent					100.0
Std. Error					-

Appendix C.2b (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 29 (July 14 - July 20)					
Male					
Sample Size					0
Percent					50.0
Std. Error					-
Female					
Sample Size					0
Percent					0.0
Std. Error					-
All Fish					
Sample ize					0
Percent					100.0
Std. Error					-
Statistical Week 30 (July 21 - July 27)					
Male					
Sample Size			1		1
Percent			100.0		100.0
Std. Error					-
Female					
Sample Size					
Percent					
Std. Error					
All Fish					
Sample Size			1		1
Percent			100.0		100.0
Std. Error					-

Appendix C.2b (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 31 (July 28 - August 3)					
Male					
Sample Size					
Percent					
Std. Error					
Female					
Sample Size		2			2
Percent		100.0			100.0
Std. Error		0.0			0.0
All Fish					
Sample Size		2			2
Percent		100.0			100.0
Std. Error		0.0			
Statistical Week 32 (August 4 - August 10)					
Male					
Sample Size		1	1	1	3
Percent		16.7	16.7	16.7	50.0
Std. Error		16.7	16.7	16.7	22.4
Female					
Sample Size			3		3
Percent			50.0		50.0
Std. Error			22.4		22.4
All Fish					
Sample Size		1	4	1	6
Percent		16.7	66.7	16.7	100.0
Std. Error		16.7	21.1	16.7	

Appendix C.2b (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 33 (August 11 - August 17)					
Male					
Sample Size		2	6		8
Percent		20.0	60.0		80.0
Std. Error		13.3	16.3		13.3
Female					
Sample Size			2		2
Percent			20.0		20.0
Std. Error			13.3		13.3
All Fish					
Sample Size		2	8		10
Percent		20.0	80.0		100.0
Std. Error		13.3	13.3		
Statistical Week 34 (August 18 - August 24)					
Male					
Sample Size		6	5	1	12
Percent		23.1	19.2	3.8	46.2
Std. Error		8.4	7.9	3.8	10.0
Female					
Sample Size		4	10		14
Percent		15.4	38.5		53.8
Std. Error		7.2	9.7		10.0
All Fish					
Sample Size		10	15	1	26
Percent		38.5	57.7	3.8	96.2
Std. Error		9.7	9.9	3.8	

Appendix C.2b (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 35 (August 25 - August 31)					
Male					
Sample Size		25	28	5	58
Percent		26.9	30.1	5.4	62.4
Std. Error		4.6	4.8	2.4	5.1
Female					
Sample Size		17	17	1	35
Percent		18.3	18.3		36.6
Std. Error		4.0	4.0		5.0
All Fish					
Sample Size		42	45	6	93
Percent		45.2	48.4	6.5	93.5
Std. Error		5.2	5.2	2.6	
Statistical Week 36 (September 1 - September 7)					
Male					
Sample Size		24	17	2	43
Percent		25.8	18.3	2.2	46.2
Std. Error		4.6	4.0	1.5	5.2
Female					
Sample Size		23	24	3	50
Percent		24.7	25.8	3.2	53.8
Std. Error		4.5	4.6	1.8	5.2
All Fish					
Sample Size		47	41	5	93
Percent		50.5	44.1	5.4	94.6
Std. Error		5.2	5.2	2.4	

Appendix C.2b (Cont'd). Age composition of chum salmon in the Canyon Island fish wheels by sex and fishing period, 2013.

	Brood Year and Age Class				
	2009	2008	2007	2006	
	0.2	0.3	0.4	0.5	Total
Statistical Week 37 (September 7 - September 13)					
Male					
Sample Size		3	3		6
Percent		25.0	25.0		50.0
Std. Error		13.1	13.1		15.1
Female					
Sample Size		3	3		6
Percent		25.0	25.0		50.0
Std. Error		13.1	13.1		15.1
All Fish					
Sample Size		6	6		12
Percent		50.0	50.0		100.0
Std. Error		15.1	15.1		
Combined Periods (June 30 - September 13)					
Male					
Sample Size		61	64	9	134
Percent		24.8	26.0	3.7	54.5
Std. Error		2.8	2.8	1.2	3.2
Female					
Sample Size		49	59	4	112
Percent		19.9	24.0	1.6	45.5
Std. Error		2.6	2.7	0.8	3.2
All Fish					
Sample Size		110	123	13	246
Percent		44.7	50.0	5.3	100.0
Std. Error		3.2	3.2	1.4	

Appendix D1a. Results of secondary marking study to test for short term tag loss for sockeye captured at the Canyon Island fish wheels, 2012.

Stat. Week	Canadian Catch	Tags Recovered	Fishery Ratio	Fish Examined for 2nd Marks	Number of 2nd	Sample Ratio	Fishery Ratio - Sampled Ratio
25	373	10	2.7%	200	7	3.5%	-0.8%
26	608	9	1.5%	200	3	1.5%	0.0%
27	1672	39	2.3%	200	5	2.5%	-0.2%
28	2079	43	2.1%	200	2	1.0%	1.1%
29	2571	70	2.7%	200	7	3.5%	-0.8%
30	7012	160	2.3%	200	4	2.0%	0.3%
31	4633	91	2.0%	200	6	3.0%	-1.0%
32	5427	176	3.2%	200	8	4.0%	-0.8%
33	3419	126	3.7%	200	5	2.5%	1.2%
34	1526	100	6.6%	200	15	7.5%	-0.9%
35	547	31	5.7%	200	6	3.0%	2.7%
36	187	16	8.6%	110	5	4.5%	4.0%
37	2	2	100.0%				
Total	30,056	873	2.9%	2,310	73	3.2%	-0.3%

Appendix D1b. Results of secondary marking study to test for short term tag loss for sockeye captured at the Canyon Island fish wheels, 2013.

Stat. Week	Canadian Catch	Tags Recovered	Fishery Ratio	Fish Examined for 2nd Marks	Number of 2nd	Sample Ratio	Fishery Ratio - Sampled Ratio
25	651	6	0.9%	193	7	3.6%	-2.7%
26	611	69	11.3%	177	23	13.0%	-1.7%
27	897	71	7.9%	188	12	6.4%	1.5%
28	766	29	3.8%	191	9	4.7%	-0.9%
29	7688	176	2.3%	195	5	2.6%	-0.3%
30	5366	149	2.8%	195	5	2.6%	0.2%
31	5340	174	3.3%	197	3	1.5%	1.7%
32	1721	70	4.1%	186	14	7.5%	-3.5%
33	870	43	4.9%	195	5	2.6%	2.4%
34	535	31	5.8%	193	7	3.6%	2.2%
35	517	36	7.0%	189	11	5.8%	1.1%
36	108	4	3.7%	92	7	7.6%	-3.9%
37	55	4	7.3%	28	0	0.0%	7.3%
Total	25,125	862	3.4%	2,219	108	4.9%	-1.4%